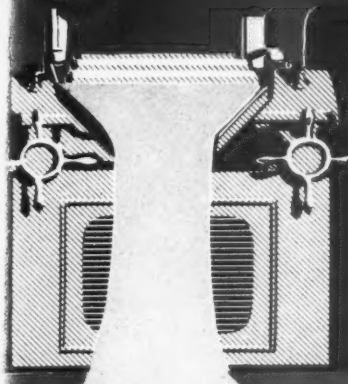

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Established 1911

THE TECHNICAL MAGAZINE FOR MANUFACTURERS OF PAINT, VARNISH, LACQUER AND OTHER SYNTHETIC FINISHES

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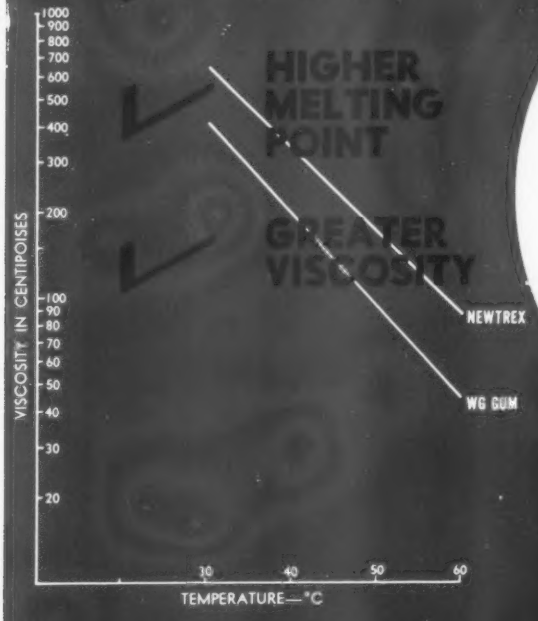

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TYPICAL ANALYSIS

COLOR	WG-WW
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ACID VALUE	161
SAPONIFICATION VALUE	167

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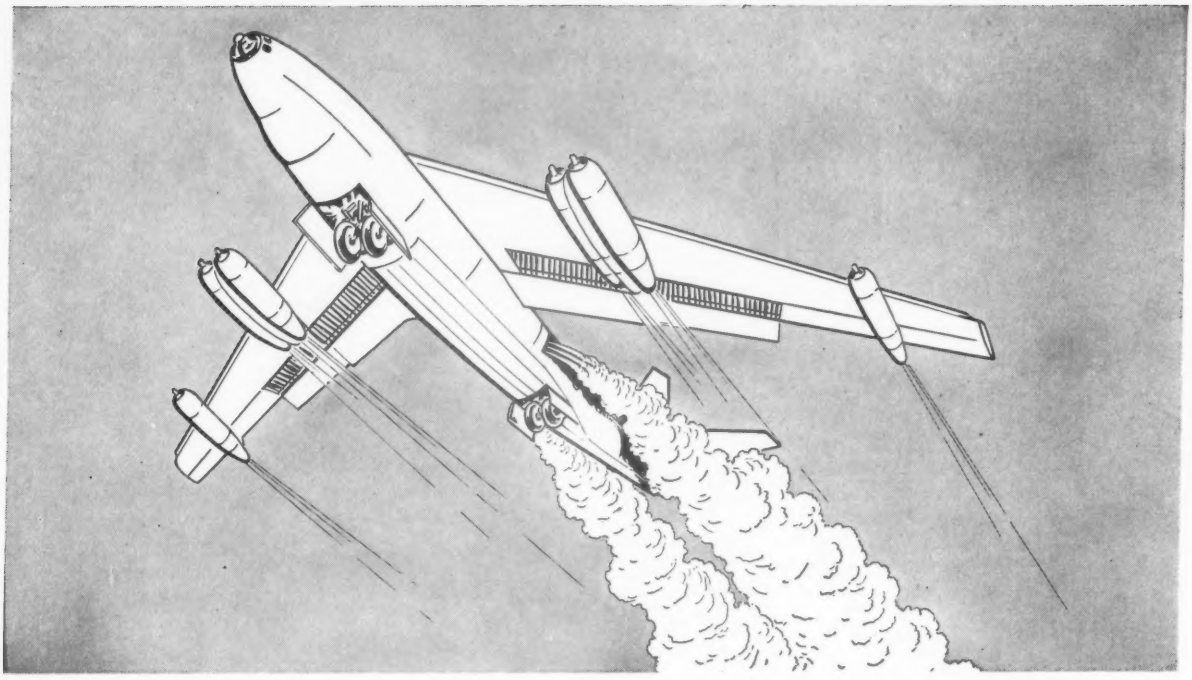

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PAINT and varnish PRODUCTION

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VOL. XXX NO. 2

FEATURES

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NEXT ISSUE

Rubber-based paints have created considerable interest in the paint industry during the last few years. The popular rubber-solution types in which synthetic rubber and a weather-resistant pigment are incorporated in a vehicle of treated drying oils, aromatic hydrocarbons, and coal tar thinners have found many uses as a masonary paint. However, a more recent development in which various forms of rubber have been dispersed in water has shown considerable promise.

Our March issue will carry an interesting article on water-thinned paints from natural rubber latex and reclaimed rubber. Formulation, methods of dispersion and mixing, and stability problems will be discussed.

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Editorial Comment

Paint Promotion

LAST year the National Paint, Varnish and Lacquer Association launched a sales promotion campaign designed to bring to the readers' attention paints for use around the home and also the importance of finishes on consumer products such as furniture, kitchen cabinets, refrigerators, automobiles, etc. *The Saturday Evening Post, Country Gentlemen, Time,* and *Better Homes and Gardens* were used in this nationwide advertising campaign.

However, the 1950 campaign has been broadened to include both the consumer and the trade separately. In this respect, other magazines will be used. For buyers' media *Time* and *Newsweek* have been selected. Manufacturers' media include *Industrial Finishing, Modern Industry, Products Finishing, Furniture Manufacture, Products Engineering, Electrical Manufacturing, Autobody,* and *Western Industry.*

Obviously, the idea behind this campaign is to make the buyer and the manufacturer finish-conscious. Whether it be furniture, automobiles or refrigerators, the Association wants the seller to consider the finish as one of the sales points in merchandising his product.

What effect will this promotional advertising have on the paint industry? First of all, it will undoubtedly help to boost sales. Secondly, the demands of users of paints and finishes will be more exact. Beauty and durability will be the outstanding qualities expected of our finishes and paints. Thus, our manufacturers must bear in mind color trends, furniture styling, etc., so that they may provide quality finishes and paints which will appeal to the general public.

Insecticidal Paints

PAINT Manufacturers expecting to market insecticidal paints must have them registered with the Insecticide Division of the Department of Agriculture in the same manner that other poisons are registered under the Insecticide, Fungicide and Rodenticide Act. According to officials of the division, insecticidal paints are considered as economic poisons just as any other pest killer and therefore, must comply with the law.

Under the law, manufacturers of such poisons must specifically state certain information on the label of the container, and failure to do so may cause cancellation of the registration.

The information required includes name and address of the manufacturer, brand name, caution statements, directions for use, antidote statements, etc. However, of particular importance is the ingredient statement in which the manufacturer has two choices. He may state the name and percentage amount of each active ingredient, together with the total percentage of inert ingredients, or state the name of each active ingredient together with the name of each inert ingredient and the total percentage of inert ingredients. In each case, the inert ingredient is assumed to be the paint itself. This is one instance when the paint manufacturer tells his customer what his product consists of—something quite unusual. Heretofore, it was just paint!

1950 Conventions

THIS year the 1950 convention of the National Association will be held in San Francisco at the Fairmont Hotel on November 15–18. The Federation of Paint and Varnish Production Clubs will hold their annual meeting and Paint Industries show at the Congress Hotel, Chicago, on November 9–11.

In deciding to hold the N. P. V. & L. convention in San Francisco, officers of the Association were mindful of the part that the West Coast plays in the Association and their eagerness to be host to this particular convention.

The Federation feels that the interests of more of their members will be better served by holding their main convention in Chicago, but as part of the San Francisco program they will have a Federation Day in the form of a West Coast meeting in which the officers of the Federation as well as Production Clubs of the West Coast will present an interesting program.

POLYMERIZING . . . *IN* AQUEOUS EMULSION

by

I. G. Farbenindustrie, A. G.

This is one of a series of translated German technical reports published by the Research Information Service, 509 Fifth Ave., New York 17, N. Y.

AS A RULE, salts of organic sulfonic acids are added as emulsifying agents in industrial polymerization of unsaturated organic compounds in aqueous emulsion. It has been found that the use of water-soluble salts of carboxylic acids with 1 to 2 carbon rings affords special advantages over the addition of sulfonic acids in the polymerization of unsaturated organic compounds in aqueous emulsion.

Carboxylic Acids

AMONG carboxylic acids with 1 to 2 carbon rings mention is made of the following: aromatic carboxylic acids (such as benzoic acid), substituted benzoic acids (such as methyl, dimethyl) and benzyl benzoic acids, or tetrahydronaphthalene-α- or β-carboxylic acids; also aromatic-aliphatic carboxylic acids (such as phenylacetic acid), phenylpropionic acid, ether acids of the type of phenyloxyacetic acid, phenyloxybutyric acid, as well as hydroaromatic carboxylic acids (such as hexahydrobenzoic acid, methylhexahydrobenzoic acid, perhydrogenated benzyl-o-benzoic acid, decahydronaphthalene carboxylic acids), and hydroaromatic-aliphatic carboxylic acids (such as cyclohexylacetic acid, cyclohexylpropionic acid and cyclohexylbutyric acid, cyclohexyl-γ-oxybutyric acid), and the ring-substituted derivatives (such as methyl-cyclohexylbutyric acid).

Polymerizable Materials

THE polymerizable unsaturated organic compounds include ethylene and all simple and multiple unsaturated polymerizable ethylene derivatives such as acrylic compounds and their homologues, vinyl ketones, styrene, butadiene, isoprene, vinyl ether, N-vinyl compounds, vinyl ester, vinyl halides or vinyl dihalides, as well as maleic and fumaric acid compounds.

The polymerization or copolymerization of these substances in aqueous emulsion should be effected simultaneously with addition of the familiar polymerization accelerators, such as hydrogen peroxide, persulfates, perphosphates, percarbonates, peracetic acid, and possibly of activating substances such as aminoalcohols, or reducing compounds such as formaldehyde sulfoxylate. Plasticizers, solvents, pigments, dyes binders or thickening agents may also be added to the polymerization charge. Admixtures of polymeric carboxylic acid salts—such as sodium polyacrylate, polymeric carboxylic acid amides or polyethoxylated aliphatic alcohols—have a favorable effect on the stability of the polymer dispersions. The polymerizable substances may be introduced into the solutions of salts of the carboxylic acids with 1 to 2 carbon rings, or vice versa; they are subsequently or simultaneously emulsified, or the carboxylic acid is first dissolved in the polymerizable substances and this solution is introduced into an aqueous solution of an amount of a base equivalent to that of the acid—or vice versa—and is then emulsified.

When salts of carboxylic acids with 1–2 carbon rings are utilized, more or less fine-grain precipitates of the polymers are obtained, as well as stable polymer dispersions, particularly if salts of higher-molecular weight carboxylic acids are used.

Advantages

ADVANTAGES of the use of salts of carboxylic acids with 1–2 carbon rings are manifold. Because of the very low foaming capacity of these salts, the emulsions and polymer dispersions tend far less toward foaming, which is often troublesome, than emulsions or dispersions produced with genuine soaps or with the previously used salts or organic sulfonic acids.

In the case of vinyl chloride polymers the carboxylates, particularly salts with an aliphatically or hydroaromatically linked carboxyl group, also have a stabilizing effect on the polymers, so that they may remain in the polymers during processing or drying. Moreover, the water resistance of the polymers is higher than that of products obtained with the aid of sulfonates as emulsifying agents. In view of the generally rather low wetting and emulsifying effect of the carboxylates with 1–2 carbon rings their suitability in the polymerization of unsaturated organic compounds in aqueous emulsion is surprising.

Examples

Example No. 1

At a pH of 7.5, one part of acrylic acid ethyl ester is emulsified in 3 parts of an aqueous solution containing 1% of the sodium salt of hexahydrobenzyl-obenzoic acid and 0.1% of sodium persulfate.

The emulsion is heated in an open vessel equipped with reflux cooler until the reflux begins, and is kept at a temperature of 90–95° C until the polymerization is completed. A very mildly foaming polymer dispersion 25% is obtained, which yields a clear and water-resistant film upon drying. The polymer has a K-value of 95 (Fikentscher's viscosity coefficient).

(Turn to Page 20)

PHENOLIC Resins in Coating Technology

Furniture varnishes based on phenolic resins dry rapidly, resist marring in shipment and withstand moisture, heat, and alcohol.

By V. H. Vedda

IN 1909, *Leo H. Baekeland* of Yonkers, N. Y. successfully applied for a patent on the method of making insoluble products of phenol and formaldehyde. He thus ushered into existence a material which had numeous possibilities in all branches of plastics—molding, casting, laminating, and coatings. However, it was not until late in 1928 that the first 100% oil soluble phenolic resin was produced on a commercial scale, and these found considerable use in the surface coating industry. Today, through continuous research, many new forms of phenolic resins are being produced. These are synthesized from new types of substituted phenols, and in addition, their resinification is carefully controlled in order to obtain desired properties.

Chemistry

THE phenol-formaldehyde reaction is very complex in nature, and is still mere supposition and open for discussion. The phenols most commonly used are the unsubstituted types, such as cresols and xylenols, p-phenylphenol and p-tert-amylphenol and p-tert-butylphenol. Many reactants are used in the production of phenolic resins suitable for coatings. Among them are compounds containing drying oils, terpene-like compounds and others containing active methylene group.

The formation of phenol-formaldehyde resins involves a condensation reaction. Both acid or alkaline catalyst may be employed with varying amounts of reactants. Several versions of the chemical reaction have been proposed and suggested. *Baekeland* and *Bender* believed that the main resin formed in the A stage of the reaction is p-hydroxyphenyl phenoxymethane (See Figure 1), and that the B-stage and C-stage reactions are primarily ether formations. (See Figures 2 and 3).

Another interesting version was that of *Amann* and *Fonrobert*. They regarded this resin as a long chain of hydroxy benzyl groups, the structure of which is indicated in Figure 4.

Classification

Phenol Types

U.S.P. Phenol—The phenol-formaldehyde resins based on U.S.P. phenol are not soluble in oil; however they can be made soluble by combination with selected fatty acids and rosin.

Terpene Phenols—The terpene substituted phenols can be converted into resinous bodies by heat condensation without the use of any methylene-containing agent. Thus, some terpene phenol resins do not contain any formaldehyde.

Alkyl Substituted Phenols—The most important phenol-formaldehyde resins in this group are based on

Fortified with phenolics, marine paints provide protection against moisture, salt air, and weather.

para-tertiary butyl phenol, para-tertiary amyl phenol, cresols, xylenols and cresilic acids. The butyl and amyl phenols yield resins of high oil solubility, while the others produce resins of limited solubility.

Binocular Phenols — The main phenol type in this group is dihydroxy diphenyl methane. Resins of this type offer little practicability and are only in the experimental stage.

Aryl Substituted Phenols—Resins belonging to this class are based on phenol phenols, benzyl phenols, and cyclohexyl phenols. Phenolic resins based on para phenyl phenol is distinguished by unexcelled chemical resistance.

All the phenols cited can be resinified with formaldehyde, either by an acid or an alkaline catalyst or both. Acid catalyst as a rule yield resins of higher oil solubility while alkaline catalyst provide for the incorporation of more formaldehyde in the reaction product resulting in a product which has good drying qualities.

Modified Types

To cover all modifications that occur in the field of phenolic resins one must consider all modifying agents and thus further classify these resins as follows:

Glycerine Modified Phenolics—Most of these resins are intermediate products and thus their use in the coating field is limited.

Rosin Modified Phenolics—These resins represent the bulk of all phenolic resins on the market. Although they show the Lieberman-Storch reaction they do not possess the drawbacks of ordinary rosin compounds, but are instead distinguished by high water resistance and quick drying.

Oil Modified Phenolics—These resins represent mostly baking types for special industrial finishes. Resins of this type usually have a high tung oil content, up to 50%.

Soluble Types

Phenolic resins may also be classified according to their solubility.

Lacquer Type Resins—These particular resins are soluble in alcohol and ketone solvents and are widely used in lacquer manufacture imparting good water impermeability qualities.

Oil Soluble Resins—These are typical surface coatings resins. These resins can further be subdivided into two groups one of which enters into chemical reaction with the oil while the other simply dissolves into the oil by heating.

Dispersion Resins—These are completely polymerized phenolic resin-oil complexes dispersed in an organic solvent. They are practically insoluble in the usual solvent, but can readily be dispersed in them.

Following this classification it is more than natural that a summary of phenolic resin properties be given. To this end we are reproducing the very complete and comprehensive tables taken from an article by *V. H. Trukington and I. Allen Jr.*, originally published in *Ind. & Eng. Chemistry Ind. Ed., Vol. 33, August 1941.* (*See Table I.*)

Phenolic Resin Coatings

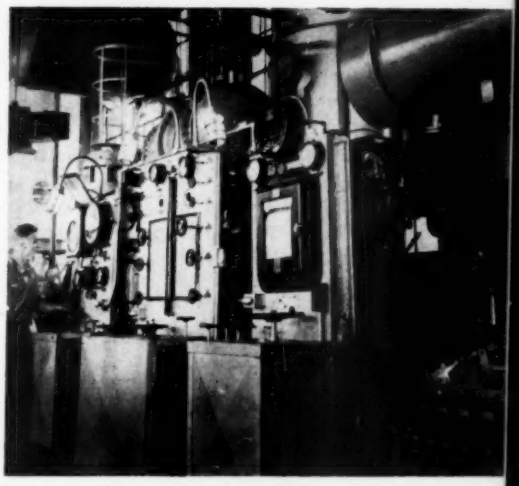
Because phenolic resins dry to a greater extent by polymerization rather than by oxidation, formulations are possible for coatings which will exhibit toughness, chemical inertness, durability, corrosion resistance, water resistance, flexibility, excellent adhesion and good drying qualities. Among all classifications of phenolic resins available for coatings, we shall discuss what we consider the most important classes, mainly: the oil soluble resins both the thermosetting and thermoplastic types, the thermosetting baking resins and the dispersion type resins.

Oil Soluble Resins

Thermosetting Group—Probably the most widely used resins of this type are those which can be processed at any length with oils and are moderately reactive when heated alone. Yet they can cure rapidly enough to be used in conjunction with rosin and ester gum. By incorporating small percentages of this type resin with ester gum we can increase the melting point by an appreciable amount, create excellent alkali resistance and reduce drying time while increase durability characteristics. These resins require great care in processing and are used chiefly in baking finishes. The ease with which they can tolerate oil makes them excellent media for varnishes where toughness is of primary importance. These varnishes will cure well in very thick films and have good electrical properties while having excellent resistivity to water and solvents. Typical applications are coil varnishes, scuff resistant finishes, and varnish bases for shelf goods.

Thermoplastic Group—This type resin is the most widely used in the coating field of all pure phenolic types. These resins offer speed in drying, durability, good water resistance, chemical inertness and excellent flexibility retention.

Section of the still used in producing phenolic resins at the Bakelite plant in Bound Brook, N. J. Materials are weighed in the above room.



Tank-car interiors coated with a baked phenolic provides a very smooth, continuous lining resistant to a wide variety of liquid chemicals.

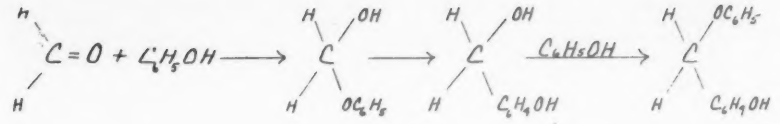


Figure 1

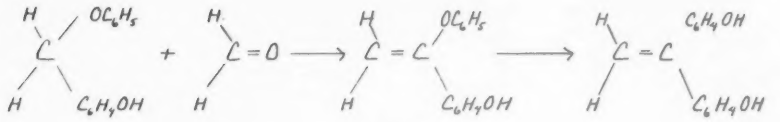


Figure 2

penes of various kinds. These newly formed compounds produce coatings of the quick drying variety, which exhibit extreme flexibility and remarkable toughness. They find use in cloth coatings and in moisture resistant coatings. Substituted phenolic resins used in conjunction with linseed and dehydrated castor oil give coatings with such good durability and water resistance that they are slowly replacing the standard phenolic resin-wood oil coating. Due to their excellent electrical properties, these resins are used on coils and electrical appliances giving excellent insulation. Phenolic resin compatibility has been extended to the utmost by the introduction of slowly thermosetting phenolic resins which can be processed with drying oils as readily as the thermoplastic type.

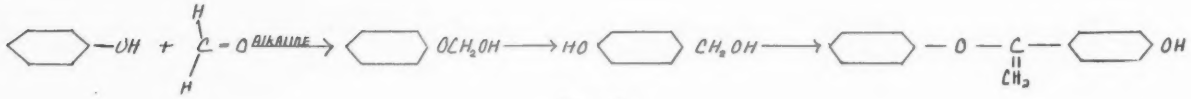


Figure 3

Thermosetting Baking Resins

These resins yield hard, glossy, abrasion resistant films exhibiting excellent electrical qualities and chemical inertness. Their only drawback is their poor resistance to strong alkaline solutions and their incompatibility with drying oils and most other resinous modifying agents. Finishes formulated with these resins find numerous applications in the food industry as tank linings and general protectors. In can coatings where flexibility is of utmost importance due to the stresses involved in forming coated can stock, selected modifying agents must be employed to create elasticity. This presents a real problem because, as mentioned above, the latitude of compatibility of this type resin is rather limited.

Dispersion Resins

These resins are phenolic resin-oil complexes that are completely polymerized, dispersed in an organic solvent. They yield the most unusual phenolic type coatings on the market. Their main property is that of drying due to the evaporation of the solvent thus having little or no penetration at all even when applied to porous surfaces. Their other outstanding feature is their high resistance to the passage of moisture and their excellent exterior durability. Due to these unique qualities, they find application on alloy metals to protect them against moisture and inherent corrosion. They are extensively used as primer vehicles both on metal and wood.

In the last few years, leading manufacturers of phenolic resins have tried to depart from straight line phenol-formaldehyde reaction resins. Thus we find resins that are the product of reactions of phenol with drying oils and in other cases with ter-

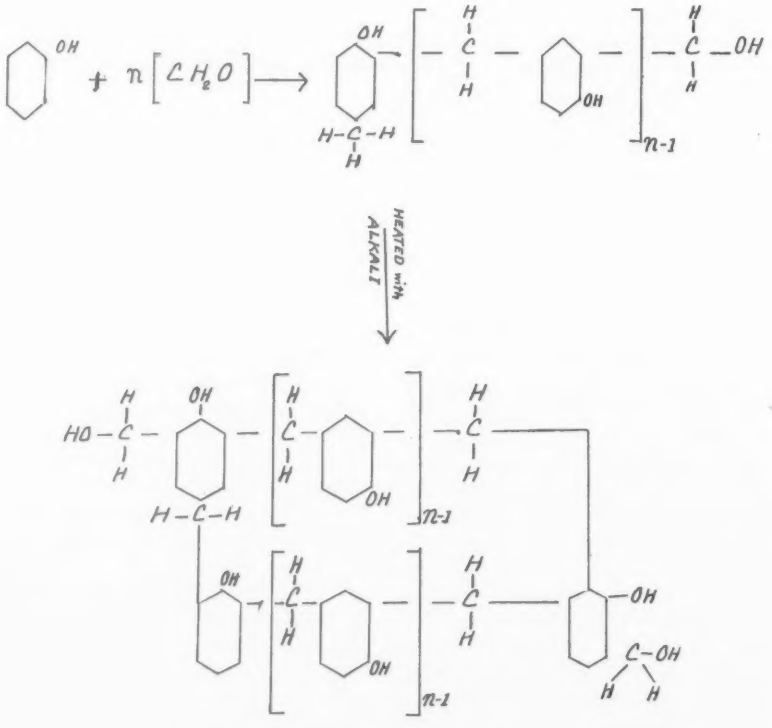


Figure 4

TABLE I. PROPERTIES OF RESINS AND VARNISHES FROM PHENOLIC COMPOUNDS AND FORMALDEHYDE

Phenolic Compound	Resin Reaction Conditions				Resin Properties*				Varnish Properties**			
	Catalyst	Mol. ratio, CH_2O: phenol	Time, hr.	Temp., °C.	Type	Melting point, °C.	Color	Light resistance	Oil sol.	Gelation time, min.	Drying time, hr.	Color stability
Phenol	Alkali	3.0:1	40	25	H. H.	Liquid	W. W.	Good	Insol.	..	..	...
	Acid	1.0:1	5	100	P. F.	86	L.	Poor	Insol.	..	..	...
ALKYL-SUBSTITUTED AND RELATED COMPOUNDS												
o-Cresol	Acid	1.0:1	10	100	P. F.	80	Yellow	V. poor	Sol.	51	24+	V. poor
	Alkali	3.0:1	24	25	Sl. H. H.	Liquid	Red tint	V. poor	Sol.	..	24+	V. poor
m-Cresol	Acid	1.0:1	½	100	P. F.	108	L.	V. poor	Insol.	..	..	...
	Alkali	4.0:1	48	25	H. H.	Liquid	Red tint	Fair	Insol.	..	..	...
p-Cresol	Acid	1.0:1	3	100	P. F.	104	L.	Fair	Sol.	24	5	Fair
	Alkali	4.0:1	48	25	H. H.	Crystals	L.	Good	Sol.	..	6	Good
Xylenol (3,5-dimethylphenol)	None	1.0:1	5	100	P. F.	89	Yellow	Poor	Party sol.	29	10	Poor
	Alkali	2.0:1	12	25	H. H.	101–103, crystals	Yellow	...	Insol.	..	..	...
Xylenol (3,4-dimethylphenol)	Acid	1.0:1	1	100	P. F.	104	L. yellow	Fair	Sol.	27	8	Poor
	Alkali	2.0:1	40	25	H. H.	100–102, crystals	Yellow	...	Sol.	23	8	Fair
Xylenol (2,5-dimethylphenol)	Acid	1.0:1	15	100	P. F.	123	Yellow	Fair	Sol.	30	7	Poor
Xylenol (2,4-dimethylphenol)	Acid	1.0:1	5	100	P. F.	72	Yellow	Fair	Sol.	27	7	Fair
o-Ethyl	Acid	1.0:1	3	100	P. F.	81	L. yellow	Poor	Sol.	30	7	Poor
	Acid	1.0:1	3	100	P. F.	86	L. yellow	Fair	Sol.	27	6	Fair
p-Ethyl	Alkali	2.0:1	24	25	H. H.	Crystals	L. yellow	Good	Sol.	..	6	Good
p-tert-Butyl	Acid	1.0:1	12	100	P. F.	96	L. yellow	Fair	Sol.	34	5	Fair
	Alkali	2.0:1	40	25	H. H.	Liquid	W. W.	Good	Sol.	35	6	Good
p-tert-Amyl	Acid	1.0:1	17	100	P. F.	88	Yellow	Fair	Sol.	32	5½	Fair
	Alkali	2.0:1	46	25	H. H.	Liquid	L. yellow	Good	Sol.	26	6	Good
p-tert-Hexyl	Acid	1.0:1	18	100	P. F.	85	L. yellow	Fair	Sol.	35	6	Fair
p-Isooctyl	Acid	1.1:1	13	100	P. F.	91	Sl. yellow	Fair	Sol.	39	6	Fair
Thymol	Acid	1.0:1	3	100	P. F.	92	Yellow	Poor	Sol.	39	18+	Poor
Carvacrol	Acid	1.0:1	5	100	P. F.	97	Yellow	Poor	Sol.	36	18+	Poor
Guaiacol	Acid	1.0:1	6	100	P. F.	77	Black	V. poor	Insol.	..	..	...
Eugenol	Acid	1.0:1	8	100	Liquid	...	Black	V. poor	...	..	..	...
Isoeugenol	Acid	1.0:1	5	100	P. F.	70	Black	V. poor	Sol.	39	24	Poor
Trimethylphenol	Acid	1.0:1	8	100	P. F.	85	Brown	V. poor	Sol.	32	10	Poor
Terpene phenols	Acid	1.0:1	8	100	P. F.	75	Yellow	Good	Sol.	45	8	Good
Diisobutyl	Acid	1.0:1	11	100	P. F.	88	Yellow	Fair	Sol.	31	6	Fair
DI- AND TRIHYDRIC PHENOLS												
Catechol	None	0.73:1	2	100	P. F.	96	V. dark	V. poor	Insol.	..	..	...
Resorcinol	None	0.73:1	¾	100	H. H.	112	Black	V. poor	Insol.	..	..	...
Hydroquinone	None	0.73:1	1	100	H. H.	138	Black	V. poor	Insol.	..	..	...
Pyrogallol	None	0.67:1	⅓	100	H. H.	159	Black	V. poor	Insol.	..	..	...
Monomethylresorcinol	Acid	1.0:1	14	25	P. F.	119	Yellow	Poor	Insol.	..	..	...
ARYL-SUBSTITUTED PHENOLS												
o-Phenyl	Acid	2.0:1	2	150	P. F.	110	Yellow	Poor	Sol.	28	5	V. poor
	Alkali	10.0:1	42	30	H. H.	90	L. yellow	Poor	Sol.	37	8	Poor
m-Phenyl	Acid	0.7:1	4	100	P. F.	100	Yellow	Poor	Sol.	24	4	Poor
	Alkali	10.0:1	14	35	H. H.	Crystals	L. yellow	Poor	Insol.	..	..	...
p-Phenyl	Acid	1.5:1	3	130	P. F.	110	L. yellow	Fair	Sol.	24	3	Fair
	Alkali	3.0:1	24	35	H. H.	Crystals	L. yellow	Good	Sol.	16	4	Good
o-Benzyl	Acid	1.1:1	21	100	P. F.	73	L. yellow	Poor	Sol.	40	24	Poor

TABLE I. PROPERTIES OF RESINS AND VARNISHES FROM PHENOLIC COMPOUNDS AND FORMALDEHYDE (*Contd.*)

Phenolic Compound	Resin Reaction Conditions: Catalyst	Mol. ratio, CH_2O: phenol	Time, hr.	Temp., °C.	Resin Properties*: Type	Melting point, °C.	Color	Varnish Properties**: Light resistance	Oil sol.	Gelation time, min.	Drying time, hr.	Color stability
p-Benzyl	Acid	2.3:1	8	140	P. F.	95	Red tint	Fair	Sol.	25	4	Fair
p-Cyclohexyl	Acid	1.0:1	3	130	P. F.	100	L. yellow	Fair	Sol.	45	5	Fair
p-Hydroxybenzophenone	Acid	1.0:1	10	100	P. F.	78	L. yellow	Fair	Sol.	..	8	Fair
	Alkali	5.0:1	72	40	H. H.	...	Red	Fair	Insol.	..	..	...
α-Naphthol	Acid	2.1:1	1	130	P. F.	104	Dark brown	V. poor	Sol.	..	24+	V. poor
p-Phenoxy	Acid	2.3:1	65	100	P. F.	57	Red	Fair	Sol.	29	10	Fair
Dihydroxydiphenylmethane	Acid	1.0:1	6	100	H. H.	...	L. yellow	Fair	Insol.	..	..	...
o-Benzyl-*o*-cresol	Acid	1.0:1	10	100	P. F.	129	L. yellow	Fair	Sol.	..	6	Fair
p-Benzyl-*o*-cresol	Acid	1.0:1	10	100	P. F.	126	L. yellow	Fair	Sol.	..	6	Fair
CARBOXYLIC PHENOLS												
Salicylic acid	Acid	1.3:1	6	100	P. F.	125	Colorless	Good				
p-Hydroxybenzoic acid	Acid	1.7:1	10	100	H. H.	101	Colorless	Good	Although insoluble in oils, these products are useful intermediates for esterification reactions. They become soluble when modified with rosin or fatty acids and esterified.			
o-Cresotinic acid	Acid	1.4:1	12	100	P. F.	White crystals	Colorless	Poor				
m-Cresotinic acid	Acid	1.9:1	2	135	P. F.	105	L. yellow	Fair				
p-Cresotinic acid	Acid	1.4:1	2	140	P. F.	100	L. yellow	Good				

* Type: H. H. = heat hardening, P. F. = permanently fusible, Sl. = slight; melting points by ball and ring method; color: W. W. = water-white; L. = light; V = very.

**All varnish properties determined on basis of 100 parts resin to 200 parts tung oil; gelation tests at 250° C.; drying time is approximate time to reach "print-free" stage.

George Hand Named Vice Pres. of Crown Wittenberg Chemical

The Crown Wittenberg Chemical Corp., of Long Island City, has announced the appointment of George E. Hand as vice president.

Mr. Hand was formerly sales manager of the Crown Oil Products Corp., having been associated with the organization for 13 years. He was previously connected with the Cook, Swan & Young Corp., as well as Atlas Refinery of Newark. George Hand has spent all of his business life promoting the sale of drying oils and is considered to be an authority in the field. He has also had considerable experience with synthetic resins, particularly alkyds.

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Dietz Succeeds Lackey at DuPont

Appointment of Joseph B. Dietz as manager of the industrial sales section of the Finishes Division of the DuPont Company, was announced recently. He succeeds Henry E. Lackey, who is retiring after a career of nearly 43 years.

Mr. Dietz has been assistant industrial sales manager since 1945. A native of York, Pa., and a graduate in chemical engineering of Lehigh University, he joined the DuPont Company at the Philadelphia paint plant and laboratory in 1924 as a control chemist. After specializing on varnish research and production, Mr. Dietz in 1932 became an industrial salesman, handling furniture finishes in the Virginia-North Carolina-South Carolina-Tennessee area. He came to the Wilmington headquarters of the Finishes Division in 1945.

Mr. Lackey, native of Wilmington, joined the DuPont Company as a clerk in the accounting department in 1907, then went to the High Explosives Operating Department, where he rose to the position of assistant to the production manager. From 1919 to 1922, he was sales manager of what was known as the DuPont Chemical Company. From 1922 to his retirement, Mr. Lackey was concerned with the paint business.

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Plastics Exposition

A huge display of more than 100 case histories of the industrial and commercial uses of plastics will be unveiled in Chicago on March 28.

The presentation is now being prepared and will be shown for the first time at the National Plastics Exposition in Chicago's Navy Pier March 28–31. It will include both static and animated exhibits. This and other important decisions which broaden the scope and add to the appeal of the big industry show were revealed recently in an announcement by Dale Amos of Edinburg, Ind., general manager of Amos Molded Plastics and chairman of the Exposition committee. A specific theme for the exposition was announced. It is: "Plastics build better products and better values." It was announced simultaneously that the Society will sponsor a Conference at the Stevens Hotel in Chicago the mornings of March 29 and 30.

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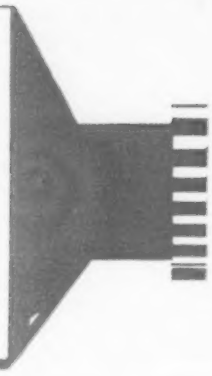
American-Marietta Contract

A contract for an extensive research project on "Blitz Can" linings has been negotiated and signed with the Army Quartermaster Corps according to an announcement by R. E. Pflaumer, Vice President of American-Marietta Company, manufacturers of paints, resins, chemicals and building products.

"Blitz Cans" are used primarily for the field transportation of a wide variety of petroleum products. Research work to be done by American-Marietta will include not only the formulation of lining materials with the proper chemical resistance and physical properties, but also practical methods of application of lining materials to the containers.

graphite as a black pigment



by

George Reich

PART 1

IT is a peculiar fact that in spite of its many paint-technological advantages graphite has become more or less of a curiosity as pigment in the paint and varnish industry. It is used in large quantities in certain inks, in the printing industry, in the manufacture of pencils, in electricity, as lubricating agent, etc., but its use as pigment has gradually dwindled to such mediocre purposes as stove paints, etc. where only the most common and impure grades of crude graphite, waste products or tailings (with 25 to 30 percent of carbon contents) are usually employed.

There can be no doubt, however, that high grade graphites in connection with efficient vehicles, well prepared and correctly applied should find much greater use in the paint and varnish industries, especially in connection with the painting of iron and steel structures and wherever comparatively high temperatures render the use of most other pigments unsatisfactory. This applies to practically all types of graphite including the artificial products of the Acheson and Castner types, although the varoius kinds of natural graphite are more commonly used for paint and varnish purposes, at least in Europe and in Russia.

Classification

THE classification of the different types of natural graphite is by no means uniform. From a practical point of view the following distinctly different grades can be distinguished:—

1) *Crystalline graphites:* — a) coarsely scaly types, fibrous graphite, flake graphite, leafy graphite, graphite scales and sparry graphite. b) fine graphite scales (finally ground waste graphite), graphite dust (containing about 30 percent carbon).

2) *Amorphous graphites* of various carbon contents.

The amorphous graphites are usually traded in form of earthy grayish black masses generally resembling amorphous carbon (soot or lampblack) although under the microscope it exhibits the same crystalline structure as the common crystalline graphite. The geological reason of this difference of natural graphites is explained differently. It appears, however, that crystalline graphite has been produced by the decomposition of metallic carbides while the amorphous variety owes its existence to the decomposition of organic substances.

Properties

THERE can be no doubt that graphite assumes a unique position among pigments in a number of ways. It really forms the most "genuine" of all pigments. It cannot be destroyed or even changed by any physical, atmospheric or any ordinary chemical means. Bleaching or darkening under the influence of light, changes through atmospheric or any other kind of oxidation, through moist air, solution or any other change induced by any vehicle or solvent or any other liquid, or any reaction with the base surfaces is entirely out of question. This applies even to very active chemical substances such as concentrated mineral acids, caustic alkalies, hydrogen peroxide at ordinary temperatures, etc. rendering this a very desirable pigment in chemical works or for chemical apparatus of practically any kind. Smoke, dust, steam and hot cinders, flue dust, etc. do not touch this material, the only chemical combination of any visible action on graphite is highly concentrated nitric acid in combination with chlorates, or alkaline chromates at ordinary temperatures. Graphite can, therefore, be mixed with any other pigment irrespective of the chemical action of such admixtures.

Another feature of graphite is its stability at temperatures unattained by any other known pigment. It remains undecomposed even at red heat. Graphite paints of suitable composition therefore are highly useful wherever particularly severe chemical or thermal influences are indicated, the limit of usefulness of the paints being that of the vehicles and solvents employed. Some other typical properties of graphite as paint pigment are found in Table I.

Stove Paints

The cheapest grades of graphite, as far as the degree of purity and fineness is concerned, are required for the commercial stove paints, although some of the high grade *stove polishes* contain some of the better qualities of crystallized graphite. It is not the purpose of this article to dwell in detail on the manufacture of these paints, although quite a number of them are made up on the usual paint bases. Some of these paints are for ordinary stove or furnace work and for temperatures of not higher than 300 to 400 degrees Fahrenheit, others are made up for still higher temperatures while the best qualities are for maximum temperatures and high polish.

It is obvious that the high-temperature stove paints cannot be made up with organic substances, most of them representing mixtures of crystalline and amorphous graphite (or boneblack) with waterglass. The bone- or lampblack is usually added

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IMPROVING DRYING PROPERTIES O

By
H. L. Rice

THE war and present existing conditions in China, must of necessity compel the utilization by the paint industry of drying oils originating in America. No matter how busy paint chemists may be, they must interest themselves in new developments, which will broaden the application of domestic and other American oils. Economy dictates that the softer oils be used wherever possible, as no one knows to what extent the supply of Chinawood oil will be available at prices affording its use again.

However, prospects for the future indicate that the use of natural drying oils as such will be less and less. Awareness on the part of the future user and the premium he would have to pay for modified oils, will necessitate at this time intense research for the utilization of our raw materials. At the rate our knowledge of oil chemistry is expanding, it is possible to conceive not only modification of the natural drying and semi-drying oils, but also of the non-drying oils, which in the main is the subject of this article. The structural make-up of these various types of oils is rather similar, as all are triglycerides—mostly C_{18} fatty acid type. From the viewpoint of drying, the most important difference is the absence of functional groups in the non-drying oils. There are many different ways of creating the missing functional groups, some being more than theoretically possible. In the laboratory, ways and means are being studied so as to bring about a transformation of non-drying oils, having the properties of dehydrated castor oil. It is hoped that in due time, large-scale production methods will evolve.

Polymerization of Drying Oils

WORK done in the rubber field offers an excellent starting point. Yet the problems of synthetic rubbers and of synthetic drying oils are rather different. The manner in which they are different may be explained as follows: A polymer, in order to show properties typical of rubber (resilience, softness, insolubility, etc.), must be a linear polymer with possibly a few cross linkages and of high molecular weight. The polymerization must be carried to a point where only a few functional groups remain in order to permit a "cure."

When considering the polymerization of a drying oil, there must be a soluble liquid of relatively low molecular weight for rubber, and with many remaining functional groups ready to react, to bring about drying or bodying. Thus far most of the polymerization of drying oils investigated have suffered from one or several disadvantages, such as lack of proper storage stability, incompatability with other ingredients, insufficient solubility in aliphatic hydrocarbons, dark in color, danger of spontaneous combustion, drying too rapidly, becoming brittle upon aging, after yellowing, and high in price.

Carbic Anhydride Resins

AT this point reference must be made to an extremely new class of synthetic resins, which are now available commercially and can be considered a rather versatile group of raw materials for coating. The resins are classified as follows: Resin-Modified, Non-Heat Hardening Type, and Heat-Reactive and Air-Drying Liquid-Type. For the present, it is with Non-Heat Hardening type that this article will deal with, since, when formulated with soft oils, they yield coatings which dry with commercially acceptable speeds.

The most versatile and useful resins are the heat reactive and air-drying liquid C-9 resins produced by the Bakelite Corp. Bakelite BR-17920, is highly recative, and of particular value in the processing of soft oils. It will greatly accelerate the bodying action of regular drying oils such as linseed oil, but their most important use today is in converting semi-drying oils into a classification of regular drying oils by co-polymerization means. The extreme reactivity of this type of resin, may be illustrated by the following experiment:

At 480° F, if heated alone, BR-17920 resin will gel in about 15 to 16 minutes. If this resin is extended to a 50 gallon length linseed oil, Q viscosity, gelation will occur within an hour at 540° F. To compare the above illustration with Chinawood oil, this resin is cooked with 2 parts Chinawood oil, at 480° F, with gelation occurring in about 10 minutes.

It can therefore be seen that there is a direct manifestation upon the speed of bodying of our semi-drying oils through the use of BR-17920.

Let us probe further to understand the full value which resins such as Bakelite BR-17920 can bring to full utilization and benefits of our domestic soft oils.

Table I illustrates the increase in viscosity of linseed oil, in the alkali refined state, catalyzed condition, and bodies state with BR-17920 at 585° F.

Table II illustrates the unique features of these resins in increasing the viscosity rate of linseed oil over the medium viscosity range of bodied oils.

The above results indicate clearly that the resin oil combination is very highly reactive, having features

of relatively fast air-drying characteristics, and producing tough hard films which can be obtained with the use of this resin. The fact that this type of resin is compatible with soft oils, and the readiness with which such solutions may be cross blended with a wide range of film forming materials is due in part to the resin polymerization.

However, there are several factors which are worthy of consideration when employing this type of resin. Careful selection of all raw materials is required when the use of resins such as BR-17920 is employed. Both the resin concentration and the degree of polymerization must be changed to suit the required and specific application.

For example, it may be required

ES OF SOFT OILS

to stock a concentrated resin oil blend in tanks for general use, if that be the case, as little as 12½ gallons of linseed oil may be treated with 100 lbs. BR-17920 to give a stable resin base which can be worked into any formulation of 12½ gallon catalyzed linseed oil, Body (X–Y).

If it is desirable to reduce the kettle time used in cooking a varnish, the linseed oil can be treated in quantity at a length of 75 gallons, linseed varnish oil, Body (Z–Z_4). The use of such an oil would permit the preparation of a medium length all-linseed enamel liquids within a half an hour at 560° F.

Final properties of this type of resin have been found to yield films exhibiting remarkable mar-proofness with good flexibility and adhesion.

The physical properties of this resin are as follows:

Acid number, 46–60.

Color, not darker than 2L (Hellige) when reduced to 3 resin to 1 toluol; viscosity, 250 to 550 K.V. specific gravity, 1.025 to 1.035.

The extreme reactivity of this resin is indicated by the fact that it will gel from 9 to 15 minutes when heated alone at 210 C. Were it extended to 50 gallon length with Q linseed oil, gelation will occur within 50 minutes at 540° F. It can be said that this type of resin lends itself very aptly for the following purposes:

1. In the preparation of bodied varnish and blending oils.

2. In the preparation of varnishes from soft oils which have unusual through drying.

3. In the preparation of coatings which air dry, or bake rapidly to hard light colored films.

4. In the improvement of the hardness of phthalic alkyds.

Using Polyols

THUS far we have considered methods to improve drying oils with the hydrocarbon portion of the molecule. Let us take one that starts from the other end, as for instance in the case of the unsaturated fatty acids of drying oils attached to the tri-functional type of alcohol, as glycerol. Predictions, according to the theory of functionality, is that molecular growth should be accelerated, if alcohols of higher functionality are used instead of glycerol.

Some of the alcohols available for this purpose are sorbitol, and mannitol.

Let us consider the use of sorbitol in producing from soft oils rapid drying oils. Sorbitol, a straight six carbon atom chain, polyhydricalcohol has a molecular weight of 182. For the formulation of protective coatings, here is a pure raw material, which is not only plentiful, but economical as well. When employed with tall oil or fatty acid esters and alkyd resins, it produces unusual stable, compatible and rapid drying coatings, which have films of excellent adhesion, flexibility and durability. The ease with which all types of pigments are easily wetted and ground with such vehicles formulated from these polyols is an outstanding feature, and utility of this material.

Another use for sorbitol lies with other types of polyhydric alcohols. Products made up from such mixtures not only retain excellent properties imparted by sorbitol, but also exhibit a versatility, not usually obtained with any single polyalcohol, especially in the control of melting points, viscosities and solubilities of the maleic and phenolic-modified rosin esters. The chemistry of sorbitol during esterification is as follows:

If sorbitol is heated with organic acids under usual conditions of esterification, anhydridization will take place as well as esterification. Water will thus split off between hydroxyl groups to form inner ethers.

When sorbitol is heated with organic acids at temperatures above 150° C, more than one of the sorbitans are formed. 1,4- and 3,5- sorbitans can lose a second mole of water to give sorbides in this manner:

The esterification product of sorbitol is actually a mixture of esters of hexahydric sorbitol, tetra hydric sorbitans, and dihydric sorbides. To a large extent, the reacting acids will determine the relative amounts of these materials. This in a large measure will be determined by the conditions of esterification. Four hydroxyl groups are available for esterification under comparatively mild conditions. However, when stronger dibasic acids, similar to those found in alkyd resins, only about three hydroxyls become reactive. Sorbitol like all other polyols shows that its minimum esterifying efficency of unreactive rosin acids takes place at very high temperatures.

Sorbitol has a combining weight in esterification which varies, with a theoretical minimum of approximately of 45.5 (or the molecular weight of 182 divided by 4, which would be the average number of hydroxyl groups available under ideal conditions).

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. . . GRAPHITE

(From Page 11)

for the purpose of deepening the color but it should not be used where maximum temperature resistance and a lasting gloss is required. Indeed, it has been found that for all purposes of this type the simplest mixtures serve best. If high-grade crystallized graphite is ground together with sodium silicate solution, it will form a well adhering, lasting and easily polishable paint which is practically indestructable at temperatures of up to 900 degrees Fahrenheit and above, provided that the metal surface is carefully cleaned before application. Where sodium silicate is not to be employed, durable coatings made up with plain water can be prepared by mixing graphite (with or without lampblack additions) with iron sulphate. A mixture of this type frequently used in Europe consists of 10 parts of ground graphite, 3–5 parts of boneblack and 10 parts of iron sulphate well mixed and ground together; this mixture is then made up with enough water to form a suitable paste. The film produced takes a high shine if polished in the cold after perfect drying, Another mixture consists of equal parts of ground graphite, boneblack and iron sulphate with an equal volume of sodium silicate.

All these mixtures are not real paints, of course, if under paints we understand the usual pigment-vehicle-solvent combinations such as are also used for iron and steel structures of all kinds and up to temperatures of about 350 degrees Fahrenheit, although some well-composed graphite paints on organic vehicle basis are frequently used for temperatures of up to 400 degrees Fahrenheit.

In practically all these cases antirusting action of the paints forms a chief requirement. It is also important that the graphite used for these purposes does not contain any impurities diminishing the chemical and physical resistance of the compositions. It is frequently stated in this connection that this specification applies chiefly to active impurities such as iron sulphide (Fe_2S_2) retained from the ore, but this is entirely erroneous. It must not be forgotton that corrosion, particularly local corrosion starts wherever the protective film is interrupted especially where distant action of an electrochemical kind (such as is affected by zinc plating on iron) is not induced. The protective action of graphite is entirely physical, but it is quite obvious that where this graphite film is interrupted, pores may ensue which are bound to expose the surface beneath to corrosive actions of the atmosphere or any other active reagents in question. It is for this reason that high grade graphite must be free of any kind of physical impurities including silica or silicates in spite of the fact that these substances may be entirely neutral.

Chemical Factors

SUBSTANCES like iron pyrite particles are absolutely dangerous, of course. Pyrite is gradually oxidized by atmospheric action, the products being oxide of iron and sulphurous acid.

The acid formed not only attacks the metallic base but the vehicle of the paint films as well as the other mineral and organic constituents of these mixtures.

In order to exert maximum protection against corrosion the graphite mixtures must not contain amorphous graphite, while the crystalline graphite used must be as finely ground as possible. This latter requirement appears to be in contrast to generally accepted conceptions. In the case of aluminum flake powder and iron mica powder, the two only other pigments exhibiting the advantages offered by their scaly structure, the material naturally must be ground, but the degree of disintegration must not exceed a definite minimum size still discernible to the naked eye.

Particle Size

IN the case of the graphite pigment, however, the degree of disintegration really cannot be fine enough. Indeed, up to about 10 years ago it proved to be practically impossible to disintegrate the purer grades of graphite to the minimum size required for maximum corrosion effects. This is due to the fact that the elasticity and tenacity of the graphite flakes increases with the degree of purity. It is practically impossible, for instance, to reduce the size of pure graphite crystals to less than about 0.06 to 0.07 millimeters, equalling about 200 to 230 USA mesh (about 80 to 100 German DIN-mesh or 180 to 200 British mesh), although a considerable proportion of the ground product was of smaller size. Modern grinding machinery and methods have reduced this minimum size considerably, however. Graphite powders of to-day consist of particles averaging less than 0.02 mm (about 600 to 650 USA-mesh) with a considerable proportion of less than 0.01 mm particle size.

The finer the grain of the pigment, the more uniform is the paint, the greater the spreading capacity, the relative covering power and the homogeneity of the film.

Graphite of any quality and practically any degree of fineness can be used in connection with any of the common vehicles and solvents, which are selected in accordance with the purposes of application in question. Oil of turpentine and some suitable synthetic resin are usually employed in these combinations, a somewhat unusual addition frequently made to these mixtures being a small quantity of water which is supposed to ensure better mixing qualities and a greater degree of lasting homogeneity of the mixtures. A paint often used for application to steel structures is composed of the following:—

Pulverized graphite	20 lbs.
Water (to grind in graphite)	20 ozs.
Oil of turpentine	20 gals.
Lampblack (for darkening)	20 ozs.

Another mixture for the painting of sheet steel roofs is reported to be combined as follows:—

Finely ground graphite	2.3 lbs.
Oil of turpentine	23.0 lbs.
Carnauba wax	0.5 lbs.
American lampblack	1.5 lbs.

PROPERTIES OF GRAPHITE

Table I

Covering power	Good
Fastness to light	Very good
Compatibility with other pigments	Good
Wettability	Easy
Drying capacity	Low
Heat resistance	Unlimited
Weather resistance	Excellent
Resistance to acids	Excellent
Resistance to alkalies	Excellent
Resistance to salts	Excellent
Specific gravity	2.3–2.5
Oil consumption	60%

. . . DRYING PROPERTIES

(From Page 13)

The degree of flexibility to films, which sorbitol is said to impart may be due to the uninterrupted six carbon chain. The flexibility in turn should promote uniform adhesion which may be also due to the slight degree of polarity of the other groups, notably some of the inner ethers.

Alkyds from Polyols

IN order to fully comprehend the influence of the various polyols upon alkyds, in rendering final improved properties of flexibility and adhesion. we should start with maleic anhydride.

Maleic anhydride is employed in several ways in alkyd resin manufacture. In conjunction with rosin it has been used very extensively. With rosin, maleic anhydride forms an addition product containing a tribasic acid, and having a much higher melting point than rosin. However, with the employment of polyhydric alcohols in esterification, maleic anhydride produces light colored resins of a high melting point, which have found extensive use in oleo-resinous varnishes and lacquers containing nitrocellulose. Glycerol has been the most used polyhydric alcohol. However, at equal maleic anhydride concentration and acid numbers, other polyols will cause the resin to melt uniformly at 10° C higher than their glycerol analogues. To prevent gelation and to avoid insolubility in drying oils, the amount of maleic anhydride used is less than the theoretical quantity to saturate the rosin. Approximatetly, equal melting points can be obtained with a polyol such as sorbitol, by employing 2% less maleic anhydride.

In order to obtain permanent flexible film forming plasticized alkyds, it must be necessary to synthesize them from the long chain aliphatic dibasic acids such as adipic and sebacic. With glycol esters only straight chain polymers are formed, characteristics of which are very much dependent on the molecular size of the straight chains. With materials of high molecular weight chains, elastomers with rubber like properties results. With materials of low molecular weight chains, only viscous liquids results, and of more importance is the fact that the straight low molecular chains resulting from glycol esters are not heat convertible or of the curing type.

Esters of polyhydric alcohols containing three or more hydroxyls groups are heat convertible, since cross linkage between the chains occurs. This is due to the high degree of functionality of polyols such as sorbitol, as compared to glycol or glycerol. The advantages obtained with use of a polyol such as sorbitol are greater film strength and toughness. It is necessary at times to avoid heat curing because this destroys the flexibility of the film by blocking off a portion of the third hydroxyls in glycerol. In such cases, it is not necessary to employ a higher functional polyol such as sorbitol. A good example of this would be the mixed ester of glycerol, sebacic, and castor oil acids. This type of alkyd may be blended with hard film forming materials and may act as a plasticizer to render flexibility, elasticity to tough films over a wide temperature range. For this purpose alone, there would be some use for the low molecular weight chain of glycol esters in alkyd manufacture.

Since sorbitol and pentaerythritol are plentiful and available they may be used more extensively to provide quick drying and hard films, which have greater resistance to water, bet-

Type of Oil	Viscosity in Poises	Viscosity Gardner-Holdt	Holding Time in Minutes at 585° F
Alkali Refined Linseed Oil	24	Z	258
Alkali Refined Linseed Oil with BR-17920—50 Gallon Length	24	Z	37
Catalyzed Linseed Oil	24	Z	200
Catalyzed Linseed Oil with BR-17920—50 Gallon Length	24	Z	28
Body Q Linseed Oil	24	Z	105
Body Q Linseed Oil with BR-17920—75 Gallon Length	37	Z–2	2
Alkali Refined Linseed Oil—75 Gallon Length with BR-17920	100	Z–5	25
Alkali Refined Linseed Oil—75 Gallon Length with BR-17920	100	Z–5	138
Catalyzed Linseed Oil with BR-17920—75 Gallon Length	24	Z	45
Catalyzed Linseed Oil with BR-17920—75 Gallon Length	100	Z–5	72
Body Q Linseed Oil with BR-17920—50 Gallon Length	100	Z–5	8

Table I

Type of Oil	Viscosity in Poises	Viscosity Gardner-Holdt	Viscosity Increase Time in Minutes
Q Linseed Oil	24	Z	260
Ester Gum—75 Gallon Length	24	Z	180
Bakelite Resin BR-17920, 75 Gallon Length	24	Z	10
"	68	Z–4	55
"	100	Z–5	80
"	150	Z–6	108
Bakelite Resin BR-17920, 50 Gallon Length	100	Z–5	20
"	260	Z–6	38

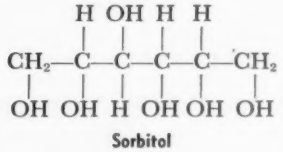
Table II

ter flexibility and all around durability. Because of the great number of hydroxyls per molecule involved, control of the esterification process is more dicffiult. With sorbitol, the product of esterification is actually a mixture of esters of hexahydric sorbitol, tetrahydric sorbitans and dihydric sorbides. The relative amounts of these meterials formed are determined to a large extent by the characteristics of the reacting acids and by the conditions under which the esterification process is carried on.

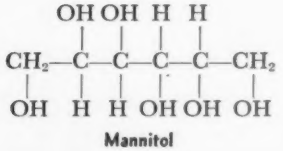
Under normal conditions of fatty acid esterification, an average of somewhat less than four hydroxyl groups remain available for esterification. With the stronger dibasic acids such as are used in alkyd resins, about three hydroxyl groups are reactive when sorbitol is used. At the high temperatures required to esterify the unreactive rosin acids, sorbitol in common with all polyols tends to show less esterifying efficiency. The combining weight of sorbitol in esterifications therefore, varies with a theoretical minimum of approximately 45.5 (or the molecular weight of 182 divided by four, the average number of hydroxyl groups available under optimum conditions). While this is higher than that of other polyols, it should be noted that the higher initial ingredient quantities required with sorbitol will obviously be reflected in greater final yields of finished product. As with other polyols, it is of course desirable to insure a reasonable excess of available hydroxyl groups over the carboxyl groups to be esterified. It is therefore suggested that competitive cost calculations be made for pound of finished product, rather than per pound of polyol required for a given preparation.

When sorbitol is employed with esters derived from rosin, ordinary simple techniques prevail as indicated in the following manner:

Carry out the reaction at a temperature range from 275°–285° C (525°–550° F), with special provision being made that the reaction can proceed under a blanket of inert gas such as carbon dioxide. The equipment required for alkyd resins of this type should be able to handle batches of several tons of material for economical operation. The reaction kettle should be that of closed construction furnished with a reflux condenser and made of metals being re-

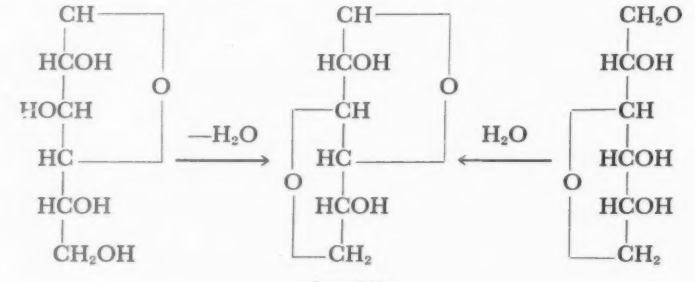


Sorbitol

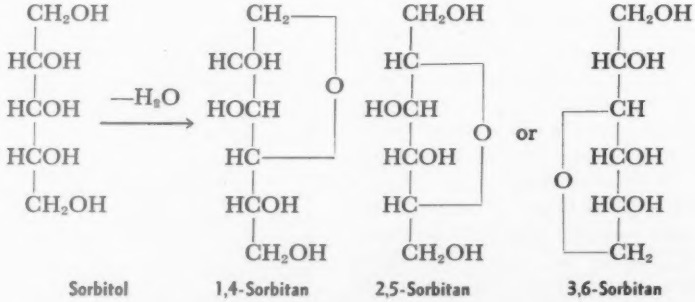


Mannitol

Figure 1



Isosorbide



Sorbitol 1,4-Sorbitan 2,5-Sorbitan 3,6-Sorbitan

Figure 2

sistant to corrosion, such as stainless steel or monel metal. Maintaining careful temperature control is important. The kettle may be heated by various ways such as liquid and vapor heat transfer systems, and by electric heating. A method for rapid cooling of resulting alkyd resin must be provided. More important, it is necessary to obtain excellent agitation in kettle. Sorbitol in the amount of 18% (dry basis on weight of the rosin itself) produces acceptable acid numbers with rosin itself or its maleic analogues. However, if 10% or more of maleic anhydride be used, it would be considered prudent to substitute some glycerol for a portion of the sorbitol. This will expedite and ease the rate of esterification. As already explained earlier in this article, resort to the use of polyols such as glycol or glycyerol with sorbitol furnishes a means of controlling the melting point, viscosity and solubility characteristics, wtihin wide limitations, of alkyds produced thereof.

It is always advisable to add the sorbitol at as low a temperature as possible, from the standpoint of maintaining proper color standard. Foaming or frothing is controlled by employing a silicone resin such as Dow Chemical Anti Foam A, in extreme small amounts. By the use of this silicone resin, a very serious problem of foaming is eliminated when sorbitol is added to solutions of hot rosin. With ester gums, sorbitol is added as soon as the charge is hot enough to permit good agitation, a good temperature being 150–177° C (300–350° F). With rosin it is most important to react the sorbitol at a high temperature as quickly as possible (after all the sorbitol had been added to the kettle). If maleics are employed, sorbitol should be added at a temperature of 195–205° C (380–400° F). In case of the phenolic syrup, sorbitol may be added immediately after the syrup is in the kettle. One important thing to remember is that the rate at which sorbitol is to be added depends upon the rate at which escaping water can be removed from the kettle and the lowest temperature to which the charge can be allowed to fall and still remain liquid enough to be agitated. Catalysts used in this reaction are lime and anthraquinone.

Ingredients (Charge Wts.)	Weights Lbs. Ozs.	Constants of Product	
W.W. Gum Rosin (81.52)	100.–0	M.Pt. (B&R)	125–128° C
Lime	0 –1.6	Acid No.	30–35
Anthraquinone	0 –3.2	Hydroxy No.	50–60
Maleic Anhydride	5.–0.0	Sapon. No.	95
Sorbitol (Dry Basis) (14.58)	18.–0.0	Color	M–K
Oxalic Acid	0.–1.6	Viscosity	B–D
D.C.—Antifoam A	Trace	(60% in Toluol)	

Formula 1

Formulation and Procedure

THE following laboratory batches illustrate the formulation preparation and final properties of final hard gums in which sorbitol may be used as compared to those commercial resins containing no sorbitol. This formulation based on evaluation in laboratory from this batch indicates a resin of medium melting point range condensable, which is both suitable for varnishes and lacquers retaining hardness without becoming brittle.

Procedure of Operation
Formula 1

1. Charge rosin, lime, anthraquinone, maleic anhydride and antifoam.

2. Melt, stir and take to 190° C (380° F).

3. Hold for ½ hour at 190° C (380° F). If desired, molten maleic may be charged to the rosin at 150–160° C (300–320° F) with the charge being held for ¾ hour before adding the sorbitol.

4. Add sorbitol as rapidly as possible.

5. Increase temperature to 282° C (540° F) and hold for 3 hours to get acid number 35–40.

6. Sparge with heavy CO_2 flow.

7. Cool to 210° C (410° F) and add oxalic acid.

8. Stir for 12 minutes and pour, yield or rosin—106%.

Procedure of Operation
Formula 2

1. Charge rosin, lime, anthraquinone, Anti-foam A, Maleic Anhydride.

2. Melt, stir and take 198° C (380° F).

3. Hold at 193° C (380° F) to accomplish reaction between rosin and maleic anhydride.

4. Add sorbitol as rapidly as possible, keeping temperature at least at 166° C (330° F) and charge the fluid. Have the condenser in take off position.

5. Raise temperature to 232° C (450° F).

6. Change condenser to reflex position and add the glycerine.

7. Take to 275° C (525–530° F) and hold for 2–3 hours for acid number 45–50.

8. Pull vacuum and sparge lightly with steam. Keep vacuum at not less than 20 inches of mercury.

9. Hold at top heat for ½ hour. Check for desired acid number. Drum directly from kettle, yield on rosin—122%.

Ingredients	Lbs. Ozs.	Constants of Product	
W.W. Gum Rosin	100–0.0	M.Pt. (B&R)	143–148° C
Lime	0–1.6	Acid No.	35–40
Anthraquinone	0–3.2	Color	N–K
Maleic Anhydride	12–0.0	Viscosity	
Glycerol	7–8.0	60% in Toluol	I–L
Sorbitol	15–0.0	60% in Xylol	P–R
D.C.—Antifoam A	Trace		

Formula 2

Speed up the finish

Come to Cyanamid For All Your Resin Needs

Cyanamid offers you alkyd, urea, melamine, phenol, maleic and copolymer resins. Each is an excellent resin in its own right. But the fact that you can buy all of them from Cyanamid can mean this to you:

C/L PRICES ON LCL LOTS!

By ordering several different resins whose *combined* quantities total a carload, you earn the carload price on each! This is just one more way you cut costs when you

MAKE CYANAMID YOUR RESIN HEADQUARTERS

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the FASTER it dries, the FASTER it sells!

Finishes to excite your Sales Manager:

	Enamel "A"	*Enamel "B"*
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Dust Free	15-30 mins.	5-10 mins.
Tack Free	1-2 hrs.	15-20 mins.
Dry Hard	3-4 hrs.	1-2 hrs.
BAKE		
300°F., No Drier	10 mins.	5-10 mins.

Just look at those drying times! They were impossible to attain, not so long ago. Now they happen every day... Enamel "A" with Cyanamid's CYCOPOL S101-1, and Enamel "B" with CYCOPOL S102-5. And many a sales manager has discovered a very pleasant correlation between speed of dry and speed of sales.

Such speed of dry may be the "plus" that will clinch many a future sale for you. And here are a few of the "extras" that come with the CYCOPOL Copolymer Resins:

COLOR and GLOSS... Both initial and retained.

COMPATIBILITY with AMINO RESINS... To produce baking enamels of all types.

RESISTANCE to ACIDS, ALKALIS and SOAPS... For kitchen appliance enamels, as well as brushing enamels in plants requiring alkali resistance, such as pulp mills.

STABILITY... Both in the resin solution itself, and in enamels formulated with them.

DURABILITY... A wide variety of enamel exposures, in Florida and Connecticut, indicates a high degree of service.

CYCOPOL S101-1 is supplied in mineral spirits solution, S102-5 in xylol. Write for complete technical data... let our technical representatives help you utilize the very special properties of these resins to the fullest. The race is to the swift!

*Trade Mark

AMERICAN Cyanamid COMPANY

COATING RESINS DEPARTMENT

30 Rockefeller Plaza, New York 20, N. Y.

. . . POLYMERIZING

(From Page 5)

Example No. 2

Three parts of acrylic acid methylester are emulsified in 7 parts of an aqueous solution which contains 1% of the sodium salt of tetrahydronaphthalene-β-carboxylic acid, 0.3% of polyvinyl alcohol and 0.1% of sodium persulfate. After initially heating the emulsion of 70–75° C and subsequent heating to a temperature above 90° C toward the end of the polymerization, a slightly thickened polymer dispersion is obtained which leaves a solid film upon drying (K-value: 84).

Example No. 3

One part of acrylic acid butylester is emulsified in 3 parts of an aqueous solution containing 1.5% of sodium phenyl-β-propionate, 0.2% of acrylic acid and 0.05% of sodium persulfate, and the emulsion is adjusted to a pH-value of 7 to 8. Polymerization under heat produces a dispersion which yields a highly adhesive film upon drying and can, therefore, be used for the manufacture of adhesive tapes. The K-value of the polymer is 92.

Example No. 4

Polymerization of one part of methacrylic acid methylester with 0.1% of "Sudan Blue" in 3 parts of an aqueous solution containing 1% of the sodium salt of hexahydrobenzoic acid and 0.1% of sodium persulfate—at a pH of 7.8 in the beginning and of 6.5 toward the end —produces a dispersion from which the polymer obtained can be precipitated under pressure by means of carbonic acid. After being heated to 120° C, washed, and dried, it can be processed into clear, attractively blue-colored shapes, such as sheets.

Example No. 5

A highly concentrated polymer dispersion which is compatible with pigments and suitable for coating wood is obtained by polymerization of 4 parts of acrylic acid methylester in 6 parts of an aqueous solution containing 0.5% of the sodium salt of hexahydro-o-methylbenzoic acid, 0.5% of peroxethylated octodecyl alcohol, and 0.5% of sodium acrylate and 0.2% of sodium persulfate.

Example No. 6

A mixture of 3 parts of styrene, 1 part of acrylic acid methylester and 0.08 parts of acrylic acid is polymerized in 12 parts of water which contains 3% of dissolved sodium salt of perhydrogenated benzylbenzoic acid, with a simultaneous influx of 1 part of aqueous sodium persulfate solution 4%, while stirring, in a tank equipped with reflux cooler. A powdery polymer, which can easily be dispersed by means of water, possibly with ammonia added, is obtained by drying the dispersion in a spray drier at the lowest possible temperature (about 60° C). By subsequent addition of plasticizers to the polymer dispersion, a cohesive film, which can no longer be emulsified in water, is obtained upon drying.

Example No. 7

Seven and four tenth parts of butadiene and 2.6 parts of styrene are emulsified in 10 parts of an aqueous solution containing a 3% sodium salt of perhydrogenated benzylbenzoic acid and 0.4% of sodium persulfate, and are polymerized by 50% within approximately 50 hours. After distillation of the unchanged monomers, precipitation, and drying, a rubber-like polymer with satisfactory properties is obtained.

Example No. 8

Nine parts of vinyl chloride and 1 part of vinylisobutyl ether are emulsified in 30 parts of water which contains 0.25 parts of perhydrogenated benzylbenzoic acid and 0.05 parts of sodium persulfate in dissolved state. The emulsion is adjusted to a pH-value of 9 by means of caustic soda solution and is polymerized at 50° C. Without formation of coagulate, a dispersion of a density of 1.078 containing 27% of polymer is obtained. The polymer has a K-value of 5, a softening point of 65, and can be shaped into sheets and objects of all kinds under application of pressure and heat.

Example No. 9

Three parts of a mixture of vinyl chloride and acrylic acid methylester in a ratio of 8.4:1.6 are emulsified in 7 parts of a 1% aqueous solution of the sodium salt of perhydrogenated methylbenzyl-o-benzoic acid, and are polymerized at 30° C, after 0.14 parts of persulfate and 0.07 parts of triethanolamine have been added. Subsequent to precipitation of the dispersion by means of acetic acid, sintering of the polymer at 80–90° C, washing with an aqueous solution of 0.5% of sodium hydroxide and 0.1% of phenylthiourea, centrifuging and drying, a white powder is obtained which can be processed into clear and mechanically strong sheets and other shapes by rolling or pressing.

Example No. 10

One part of methacrylic acid methylester is emulsified by vigorous shaking in 3 parts of an aqueous solution containing 1% of sodium decahydronaphthalene carboxylate and 0.2% of sodium persulfate, and is polymerized at elevated temperature, being stirred in an open vessel provided with reflux cooling. If the dispersion thus obtained is processed as in Example No. 4 a clear, colorless polymer with a K-value of 85 is obtained. Instead of the decahydronaphthalene carboxylic acid, hexahydrophenylacetic acid or hexahydrophenol-γ-oxybutyric acid as well as their homologues may be utilized.

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Socony Paint Products

A change in name to Socony Paint Products Company, effective Jan. 1, 1950, has been announced by the Socony Paint Products Division of the Socony-Vacuum Oil Company, Inc.

The company operates a new paint plant at Metuchen, N. J., and a division office at 59 East Van Buren Street, Chicago, Ill. For nearly 70 years until the transfer to Metuchen, manufacturing operations were carried on in Long Island City, N. Y. Other manufacturing plants of the company are in Beaumont, Texas, and Los Angeles, Calif. S. G. Lansing is president of Socony Paint Products Company.

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Crown Wittenberg Names Goodacre

In line with its newly launched program of expanded distribution and representation, the Crown Wittenberg Chemical Corp. has named A. T. "Tony" Goodacre as regional sales representative for the New York and New Jersey territories.

Mr. Goodacre is well known to the trade, having traveled the East and Midwestern sections of the country and eastern Canada during the past five years as representative of the Trojan Powder Company to call on resin manufacturers as well as those in the paint and allied industries.

SOLVENT SAFETY TRAINING

Safety Research Institute

WHILE the management or operator of a plant may provide all the mechanical safeguards and medical controls thus far developed to protect workers from the potential hazards of solvents, in the final analysis the safety of a worker depends upon his own cooperation, based upon an understanding of the reasons for the controls and his part in making them effective. Education towards this objective should be considered as much a part of the man's training as the proper use of his tools and equipment.

When a new worker is introduced to his job, his supervisor should discuss with him the solvents used, why they are used, the nature of the hazards they present, the safeguards provided to protect the employees from these hazards, and what the worker himself must do to avoid danger. Gas masks or supplied-air respirators should be tried on and he should be given an opportunity to handle and operate the various types of fire extinguishers. He can also be given printed literature to read at his convenience or to take home, if he wishes.

At intervals, perhaps two or three times a year, "refresher" meetings should be held at which all who have occasion to work with solvents at any time will be present. The plant safety engineer or whoever has the responsibility for plant safety can give a short talk on the subject of solvents and their proper use, followed by a question and answer period. If possible, a drill on the use of gas masks, fire extinguishers, and any other protective equipment provided for the men, should be held in conjunction with this meeting.

If an internal house organ is published, articles on the safe use of solvents and on gas masks, fire extinguishers, etc., can be included. These can be signed by the safety engineer, if there is one.

Posters on the bulletin board and placards in solvent storage and issue rooms may also be used as reminders, but these should be changed frequently.

If the number of employees who use solvents is large enough, it may be desirable to produce a set of slides for showing at meetings.

In the very large plant, it may be posible to prepare material such as leaflet, posters, etc., in terms of the specific processes and operations employing solvents in the particular plant. For smaller plants, much of the material already available will serve the purpose. Sources are the U. S. Department of Labor, state and municipal industrial hygiene services, the National Safety Council, the National Fire Protection Association, insurance companies and, often, the manufacturers of the solvents and of safety equipment.

INTRODUCING

KETOSOL Solvents

Trade-Mark

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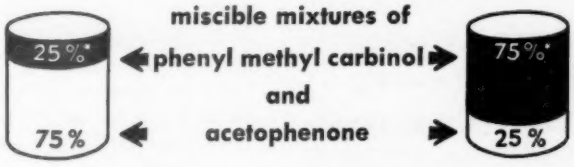

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dyes	intermediates for:
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nitrocellulose	components in:
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alkyd resins	odor-masking agents

For information, write or call the nearest CARBIDE office, requesting data sheets F-7370 and F-6970.

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A new hydraulically operated side-shifter attachment is designed for use with both the Lift King and Worksaver fork trucks. The device shifts the forks as much as four inches to the right or left of center. This increased flexibility saves storage space by making it possible to "spot" loads in odd corners, close to walls, near pillars, or in other confined transfer and storage areas. In plant and warehouse storage zones this saving is multiplied many times. In addition, the side-shifter eliminates maunal positioning in such enclosed spaces as trailer trucks and freight cars.

For information on how the side-shifter can be applied to present equipment or for data on new side-shifter equipped Yale trucks, write to The Yale & Towne Manufacturing Company, Roosevelt Blvd. and Haldeman Ave., Philadelphia 15, Pa. PVP—February.

TESTING APPARATUS

Humidity-Temperature Control

Precisely controlled variations of humidity and temperature can be repeated periodically, according to a predetermined program, by means of a new test apparatus.

Standard apparatus provides three humidity-temperature program schedules of interest to government laboratories and manufacturers supplying equipment to the government.

The apparatus consists of a test chamber, an air-conditioning unit, and a special control system. Average maximum rate of rise of dew-point temperature (between 60° and 160° F.) is plus 0.45° F. per minute, without load. Average maximum rate of fall of dew-point temperature (between 60° and 160° F.) is minus 0.75° F. per minute, without load. Average maximum rates of rise and fall of dry-bulb temperature is equal to or greater in magnitude than for dew-point temperature.

Details are given in manufacturer's Bulletin 2176, which is available upon request. American Instrument Co., Silver Springs, Md. PVP—February.

LOW-SPEED MIXER

For Viscous Materials

Stainless steel tank, 24 inches in diameter is designed for mixing of liquid and semi-viscous materials. Contents are blown out at end of each mixing operation by pressure or suction. It is equipped with a steel jacket for steam heating at pressures of 110 p.s.i. Explosion-proof motor operates through hand-operated variable-speed reduces to drive 8″ diameter, 16 blade turbine agitator at speeds from 94 to 257 r. p. m. L. O. Koven and Brother, Inc., 154 Ogden Ave., Jersey City 7, N. J. PVP—February.

STARCH DERIVATIVE

Flatting Agent

The latest in a group of starch products with unusual properties developed in National's laboratories, it is now available for product research and development. Called Dry-Flo, it is a finely divided powder with a silky texture, free-flowing to the extent that in many ways it behaves like a liquid. The presence of the hydrophobic groups makes Dry-Flo extremely difficult to wet with water under ordinary conditions; it can be wet with water if a wetting agent is used or if the dry material is first wetted with alcohol or other water-miscible solvents.

Potential applications listed by the manufacturer include rubber dusting, flatting agent in lacquers, detackifying agent for rubber articles formed by the dip method, prevention of sticking of viscous materials to container walls, and lubricating agent. National Starch Products, Inc., 270 Madison Ave., New York, N. Y. PVP—February.

National Starch

NEW PRODUCTS

WAX DISPERSION METHOD

Organisols and Lacquers

A new method of incorporating high melting waxes into various fluid compositions has been developed.

About 1% Acrawax C Powdered (based on solids) is dissolved in the hot plasticizer and solvent. The plasticizer and solvent, are, of course, those which are already being used in the product or will be tolerated by the product. This hot solution of Acrawax C is then poured very slowly into a large batch of cold organisol while it is being vigorously stirred. The Acrawax C appears to gel out immediately on coming in contact with the cold organisol and forms an extremely fine dispersion.

The incorporation of Acrawax C in lacquers and coatings of various kinds, prevents blocking or sticking due to heat, pressure or aging. The use of the above method prevents graininess or spotting inherent in older methods. Glyco Products Co., Inc., 26 Court St., Brooklyn 2, N. Y. PVP—February.

HYDROGENATED CASHEW

Waxy Solid

Irvington Varnish and Insulator Company has announced the availability in unlimited quantities of its hydrogenated cashew nut shell liquid, which is a low-melting, waxy solid consisting of a mixture of various meta substituted phenols. It contains approximately 50 per cent 3-pentadecyl phenol, 5 per cent 5-pentadecyl resorcinol, and 35 per cent phenols of higher molecular weight.

Further information and generous samples may be had by writing to the Irvington company, at Irvington 11, N. J. PVP—February

PYROMETER

Measures Up to 1200° F

General purpose pyrometer is available in temperature ranges of 0–400 to 0–1200° F. It is used for measuring surface and sub-surface temperatures. The Pyrometer Instrument Co., Bergenfield, N. J. PVP —February.

Hastings

VACUUM GAUGE

1–1,000 Micron Range

A new vacuum gauge for measurements in the range 1 to 1000 microns is announced by the Hastings Instrument Company of Hampton, Virginia. The gauge consists of an accurate electrical indicator and a small rugged pickup which screws into a ⅛″ tapped hole in the vacuum system. Fast response, interchangeability of pickups without recalibration, freedom from outgassing and corrosion, and freedom from damage by exposure to atmospheric pressure are outstanding features of the new gauge. Simplicity in installation and operation, rugged dependability, and laboratory accuracy are features of the instrument. Calibration is not affected by connecting cable length, thus allowing remote indication and recording. Hastings Instrument Co., Inc. Hampton, Va. PVP—February.

AUTOMATIC VISCOTROL

Blending Operations

The Brookfield Viscotrol is a viscosity measuring, signaling transmitting unit which is designed for use where viscosity variations during production normally occur only in one direction, and it is desired to accomplish continuous and automatic viscosity control.

When installed on such tank, vat or pipe production systems, this unit does away with manual methods of viscosity control by continuously measuring and signaling viscosity variations. It will also automatically activate various means of returning the viscosity to an optimum value or automatically shut down the process until the viscosity condition has been corrected. Brookfield Engineering Laboratories, Stoughton, Mass. PVP —February.

ADHEROMETER

Interchemical Type

The adherometer, developed in the Research Laboratories of Interchemical Corp., is designed to measure the stripping force in dynes required to remove a paint film from the surface of a metal test panel.

The test panel, six inches in length is caused to move slowly under a hard ivory cutting tool 4 mm wide, which has been beveled to a thin straight edge. The ivory tool is held by a lever arm which is weighted to hold the cutting edge firmly against the metal surface of the panel. This lever arm, mounted on a practically frictionless roller bearing, is connected to a weighted pendulum causing it to swing outward to an extent proportional to the force being utilized in stripping the 4 mm band of paint film. The amount of pendulum swing is read on an Ames gauge operating through an accurately machined cam attached to the pendulum at its axis. One scale division corresponds to a ¼ degree swing. Conversion tables provide quick means of translating the scale reading into dynes of force. Henry A. Gardner Laboratories Inc. 4723 Elm St., Bethesda 14, Md. PVP—February.

RESIN COOK INDICATOR

Records Viscosity Indirectly

Variation of load on agitator-motor is used to indicate endpoint of a resin cook. In most polymerization reaction processes, temperature is employed to show the progress of cooking. This method was considered too slow, and in many cases the reaction was carried beyond the desired endpoint causing the resin to set up in the reaction kettle, and thus forced them out of operation for long periods of time.

The load on agitator-mbtor adaption employs a thermal converter, which is connected to power leads to the agitator motor. This converter output is wired to a potentiometer-type recorder. When endpoint is reached, an alarm is sounded. This type of measurement is considered very practical where abrupt changes in viscosity take place. Leeds & Northrup Co., 4834 Stenton Ave., Philadelphia 44, Pa. PVP—February.

NEW PRODUCTS

Leeds & Northrup

CORROSION TESTING

Multi-range

Designed especially for corrosion field work, this multi-range portable potentiometer incorporates features specified by leading corrosion engineers. With this instrument, field crews can obtain fast, accurate, dependable readings over the wide ranges encountered in measuring the galvanic and electrolytic corrosion potentials of pipe lines, etc. Leeds & Northrup 4908 Stenton Ave., Philadelphia, 44 Pa. PVP—February.

EXTINGUISHER

Panic-Proof

Deviating from its standard 4 and 5 pound sizes, Randolph Laboratories, Inc., Chicago, Illinois, has produced a portable six pound carbon dioxide fire extinguisher with 20% additional fire-fighting capacity.

Randolph "6" is a compact, lightweight unit, featuring thumb-trig-ger release and self-aimed nozzle. Only one hand is required to operate this CO_2 extinguisher, from the instant it is removed from its bracket, until the flames are extinguished. With no valves or nozzles to adjust, the new "6" is panic proof, according to the manufacturer. For additional information on this new 6 lb. CO_2 unit, write Randolph Laboratories, 8 E. Kinzie St., Chicago 11, Illinois. PVP—February.

CHROME GREENS

Fine Particle Size

The first real advancement in chrome green pigments is represented by the new CP Micro-Fast Chrome Greens recently introduced by the Pigment, Chemical and Color Division of The Sherwin-Williams Company. These pigments combine an extremely fine particle size with excellent resistance to light as judged by accelerated tests or actual outdoor exposure.

Enamels made with the CP Micro-Fast Chrome Greens show little or no change after accelerated tests of 120 hours on the National Carbon Lamp or after six months exposure in Florida. Grinds considered satisfactory for enamels are obtained by two hours in a ball mill or one pass through a three roll mill for the Extra Light and Light CP Micro-Fast Chrome Greens. The medium shades require four hours in a ball mill or two passes through a three roll mill.

Since the CP Micro-Fast Chrome Greens are available at the regular Chrome Green prices, they represent a considerable advantage in quality at no increase in cost. Pigment, Chemical and Color Div. of the Sherwin-Williams Co., 115th St. and Cottage Grove Ave. PVP—February.

JANUARY • 1950
The Solvent Notebook
CSC
The Application of Lacquers at Elevated Temperatures
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Butadiene Acrylonitrile

U. S. Patent 2,491,433. William D. Wolfe, Cuyahoga Falls, Ohio, assignor to Wingfoot Corporation, Akron, Ohio, a corporation of Delaware.

A copolymer of from 40 to 80 percent of butadiene, from 60 to 20 percent of acrylonitrile and from 2 to 16 percent, by weight of the combined butadiene and acrylonitrile, of a hexadiene mixture prepared by the dehydration of 2-methyl-2,4-pentane-diol.

Alkyd-Fumarate Copolymer

U. S. Patent 2,491,409. Edward L. Kropa, Old Greenwich, and Arthur S. Nyquist, Cos Cob, Conn., assignors to American Cyanamid Company, New York, N. Y., a corporation of Maine.

The method which comprises effecting an esterification reaction between ingredients comprising (1) a polyhydric alcohol, (2) a polycarboxylic acid including fumaric acid and (3) an adduct formed by reaction of alloöcimene with ingredients comprising a member of the class consisting of (*a*) fumaric acid, (*b*) partial esters of fumaric acid and a polyhydric alcohol and (*c*) mixtures of (*a*) and (*b*), said adduct being formed while the adduct-forming reactants are admixed with a polyhydric alcohol, and reacting the reactive, modified unsaturated alkyd resin thereby obtained with an aromatic hydrocarbon which contains a $CH_2=C<$ grouping attached directly to a benzene nucleus, the aforementioned polyhydric alcohol in all cases being one which is free from unsaturation between carbon atoms thereof and in which the only reactive groups are hydroxyl groups.

Polymerization of Propylene

U. S. Patent 2,494,510. Everett C. Hughes, Cleveland Heights, and Harrison M. Stine, East Cleveland, Ohio, assignors by mesne assignments, to The Polymerization Process Corporation, Jersey City, N. J., a corporation of Delaware.

A process of polymerizing propylene to form normally liquid hydrocarbons useful as a motor fuel component, which comprises contacting propylene, in the presence of isobutane and substantially free of butylene, with a copper pyrophosphate polymerization catalyst at a temperature between about 350° and 500° F. and a pressure between about 200 and 1500 pounds per square inch to form normally liquid olefinic polymers as the primary reaction product of the propylene, said isobutane being substantially unreacted.

Emulsion Polymerization

U. S. Patent 2,494,326. Erving Arundale, Westfield, N. J., assignor to The Standard Oil Development Company, a corporation of Delaware.

In the manufacture of synthetic rubber-like materials by the polymerization in aqueous emulsion of a conjugated diolefin having from 4 to 6 carbon atoms per molecule, the improvement which comprises using as polymerization modifier 0.125 to 1.0% based on total monomer of an aliphatic mercaptan mixture consisting of about 55% dodecyl, about 30% tetradecyl and about 15% hexadecyl mercaptan.

Stable Bituminous Emulsions

U. S. Patent 2,494,708. Donald C. Jesseph, Los Angeles, California.

An emulsion consisting of water and bituminous material in which water is the continuous phase and bituminous material is the disperse phase, said emulsion being stabilized by ammonium-lignosulfonate mixed therein.

Pigment Emulsions

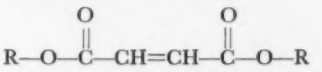
U. S. Patent 2,494,810. Cyril Hobday, Otley, and Frederick Leathley Goodall, Burley-in-Wharfdale, England, assignors to The Geigy Company Limited, Manchester, England, a British Company.

The method of making a pigment emulsion which comprises dispersing a pigment in an aqueous medium with the aid of a dispersing agent comprising a non-convertible alkyd resin and a basic substance selected from the group which consists of ammonia and alkylolamines and further dispersing in said aqueous medium a solution of a thermohardening synthetic resin in an organic liquid which is substantially non-solvent for said pigment.

Color Stabilization of Vinyls

U. S. Patent 2,491,444. Fred W. Cox, Birmingham, Alabama, and James M. Wallace, Jr., Akron, Ohio, assignors to Wingfoot Corporation, Akron, Ohio, a corporation of Delaware.

A vinyl halide resin capable of resisting discoloration upon heating which comprises a solid copolymer of 70 to 98 percent by weight of a vinyl halide and from 2 to 30 percent of an ester having the following structural formula



wherein R is an alkyl radical, said copolymer containing homogeneously dispersed therein from 0.05 to 10 percent by weight, based on the copolymer content of the resin, of sodium nitrate.

Corrosion Inhibitor

U. S. Patent 2,491,222. Herschel G. Smith, Wallingford, and Troy L. Cantrell and William L. McClintock, Jr., Lansdowne, Pa., assignors to Gulf Oil Corporation, Pittsburgh, Pa., a corporation of Pennsylvania.

A non-corrosive liquid consisting essentially of a liquid selected from the class consisting of water and water-soluble alcohols and containing a corrosion inhibiting amount of the sodium salt of 2-ethyl-hexyl, 3-methyl-butyl orthophosphoric acid.

Paint Compositions

U. S. Patent 2,494,569. Arthur J. Lewis, Helen A. Moser, and John C. Cowan, Peoria, Ill., assignors to the United States of America as represented by the Secretary of Agriculture.

A paint mixture consisting essentially of basic carbonate white lead pigment; soy bean oil that has been conjugated by treatment in the presence of nickel-carbon catalyst; the said lead pigment and oil being in the weight ratio of about 3 of pigment to 1 of oil; paint drier; and calcium oxide in the proportion of 2¾ percent to 11 percent of the basic carbonate white lead.

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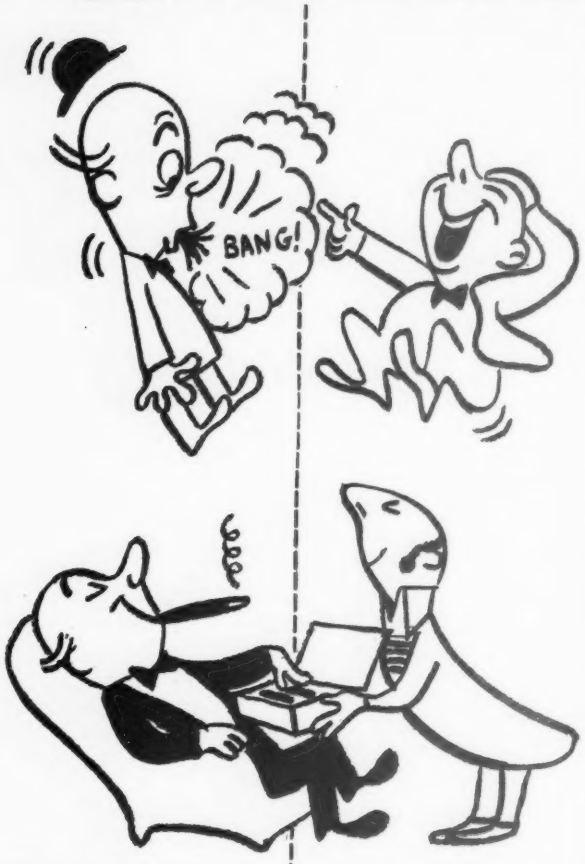

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Thompson-Hayward to Distribute Falk Products in Midwest Cities

Of particular interest to manufacturers of paints, varnishes and other protective finishes in many U. S. areas is recent news from Falk & Company that Thompson-Hayward Chemical Company of Kansas City, Missouri, will distribute Falk products from 15 key warehouses and sales offices in the midwest, west and southwest, and that Falk & Company's technical sales service department has been reorganized and expanded in order to meet the individual needs of Thompson-Hayward customers for these products.

According to Stanley D. Rogaliner, Sales Manager of Falk & Company, Thompson-Hayward offices will represent the complete line of Falkolin linseed oils, Falk quality soybean oils, Falkovar fish oils and Falkyd resins which are manufactured and processed by Falk & Company, as well as the Piccoumaron, Piccolyte and Piccolastic resins and the Hi Solv solvents which are produced by the Pennsylvania Industrial Chemical Corporation of Clairton, Pennsylvania, and distributed through the Pennsylvania Falk Chemical Company of Pittsburgh.

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Pennsalt Transfers Hampson

John C. Hampson, former Indiana field representative for the Pennsylvania Salt Manufacturing Company's Special Chemicals Department, has been named sales manager for the department's newly-formed Chicago district, it was announced by Joseph J. Duffy, Jr., departmental manager of sales.

The new sales district, with offices at 20 N. Wacker Drive, Chicago, will include the present Wisconsin, Illinois, Indiana and Missouri territories.

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National Lead Operating Georgia Lead Works

Operations carried on by the Georgia Lead Works of the Cincinnati Branch of National Lead Company have been conducted under the name of National Lead Company, Atlanta Branch, since February 1. George W. Pendery has been appointed manager of metal and pigment sales of the new branch, and will direct the sales of all the company's products coming within the scope of the branch.

Shaw of Hercules Retires

John S. Shaw, director of safety of Hercules Powder Company, retired recently. A veteran in the explosives and chemical industries, Mr. Shaw is nationally known as a pioneer in the field of industrial safety. For nearly half a century, he has devoted his efforts to standardizing chemical operating procedures and use of safety equipment to prevent industrial accidents.

From 1906 until 1913, Mr. Shaw was engaged in the production of explosives and acids for the DuPont Company at plants in New Jersey, Michigan, Wisconsin, and California. His interests lay in improving operating methods to increase yields and to cut down industrial hazards; and he was assigned to this work as assistant to the general manager of the company. It was one of the early formal efforts made in modern American industry to study and improve operations with an eye to increasing safety. In 1925, Mr. Shaw was named manager of the Safety and Service Department. He received his present title, director of safety, in 1941.

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Commercial Solvents Names Woods to Board of Dir.

J. Albert Woods, President of Wilson & Toomer Fertilizer Company, Jacksonville, Florida, has been elected to the Board of Directors of Commercial Solvents Corporation, it was announced by Major Theodore P. Walker, Chairman of the Board,

Mr. Woods was Vice President and Director of Armour Fertilizer Works from 1929 to 1934. He joined the Chilean Nitrate Sales Corporation in 1934 and became Vice President and then President of that company. In 1945 he became Vice President of W. R. Grace & Company.

Arco Co. Names Edlund

Appointment of Harold A. Edlund to the office of Director of Sales of The Arco Company, Cleveland and Los Angeles manufacturer of paints, varnishes, lacquers, enamels and many related industrial maintenance products, has been announced by H. E. Wise, President. Mr. Edlund's headquarters will be in the company's executive offices in Cleveland, Ohio.

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Am. Can Promotes Alwyn

T. E. Alwyn, Atlantic division manager of sales for the American Can Company, has been appointed general manager of sales for the company. Mr. Alwyn, who has been associated with the can manufacturing company for more than 25 years, will have direct supervision of the firm's sales activities in the United States, Canada and Hawaii. His headquarters will be in New York.

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Morehouse Demonstration

Production of fine grind enamels with Morehouse Industries Speedline equipment was demonstrated in the company's plant following a buffet supper given by the company, January 18th. One hundred seventy Los Angeles Paint and Varnish Production Club members, chemists and production men were served. George Missbach, Morehouse Industries Sales Manager, conducted the demonstration and explained the Morehouse Speedline grinding principle. This principle is the action of a Carborundum stone revolving in a horizontal plane at high speed (rotor) against a stationary stone (stator) through which the material to be processed is fed. The lower stone is adjustable in relation to its position to the upper stone during operation through a wide range from positive contact to approximately one-quarter inch distance from the upper stone.

Morehouse Enamel Grind Demonstration

Harold R. Bennett

Thresher Paint Appoints Bennett

Appointment of Harold R. Bennett as manager of industrial sales for Thresher Paint and Varnish Company, has been announced by Herschel E. Post, general sales manager of industrial finishes for Pittsburgh Plate Glass Company. Thresher Paint and Varnish Company is a Pittsburgh affiliate. Associated with the industrial finish industry for more than 25 years, Mr. Bennett has been with Thresher since 1930. He has served in various manufacturing, laboratory and sales capacities. As manager of industrial sales of Thresher, Mr. Bennett will have headquarters at Dayton, Ohio.

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Monsanto Western Div. Changes

Two changes in Monsanto Chemical Company's Western Division sales organization have been announced by Edward Schuler, general manager of the Division's chemicals and plastics sales. C. F. Trombley, now branch manager at Seattle of chemicals and plastics sales has been promoted to general branch manager of the Division's San Francisco office, and will be in charge of chemicals and plastics sales there. A. W. Hempelmann, a senior salesman in the San Francisco office will succeed Mr. Trombley in Seattle.

Falk Appoints Bisbee

In his new capacity as manager of the Philadelphia Office of Falk & Company, E. Arnold Bisbee, who has long been a well-known figure in eastern and mid-western grain circles, will draw on more than 20 years of experience with the Bisbee Linseed Company and its subsidiaries. His career in the processing industry began in 1928, when, shortly after his graduation from Williams College, he undertook the serious study of manufacturing methods at Amsterdam, New York, in the Linseed Oil Mill of Kellogg & Miller, Inc., a subsidiary of Bisbee Linseed Company. He was already manager of that mill when, 3 years later, he was transferred to the Bisbee plant in Philadelphia. In 1937, he was appointed office manager of Bisbee Linseed Company's administrative office; and by 1948 he had risen, through various important elective offices, to secretary and director of the Company.

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NPVL Ass'n Elects Surtoc

Joseph P. Surtoc, New York District Manager of Trade Sales for the duPont Company was elected a member of the Executive Committee of the New York Paint, Varnish and Lacquer Association at a recent meeting of that committee. He fills the unexpired term made vacant by the recent resignation of Sam Press who has left the industry.

Joe Surtoc was educated in Europe, Canada and United States. He has been a member of the New York Association for over 20 years and served on many committees.

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Crown Wittenberg Named Agent

A. J. Wittenberg, president of Synthetic Resins, Inc., Valdosta, Ga., announced the appointment of the Crown Wittenberg Chemical Corp., 2-14 49th Ave., Long Lsland City, as general sales agents for all its products.

Synthetic Resins, Inc. with modern Dowtherm plant facilities in the heart of the gum rosin belt, manufactures synthetic resins having a rosin base. Plans have been made to expand its manufacturing operations to include other synthetic resins.

W. W. Allen, vice president in charge of operations at the Valdosta plant states that with bulk storage capacity now established in New York and Chicago and additional tank cars under lease, greater areas will now be serviced on tank wagons and tank cars. Many new and important developments in the field of synthetic resins will be announced shortly and made ready for the market.

U. S. Testing Elects Esselen

The United States Testing Company, Inc., has elected Gustavus J. Esselen as vice president, it was recently announced by Allen L. Brassell, president. Dr. Esselen will continue in active direction of the Esselen Research Division of the United States Testing Company, Inc., recently created by the merger of the Esselen Research Corporation with the United States Testing Company, Inc.

Dr. Esselen has been active in applying chemistry to industry for the past twenty-nine years. During the war he was consultant to the Baruch-Conant-Compton Rubber Survey committee. Later he was chairman of the Tropical Deterioration Administrative Committee. This was a joint committee of the Army and Navy with the National Defense Research Committee (NDRC), in charge of coordinating all work relating to the prevention of deterioration of material in the tropics. He was also a member of the Chemical Referee Board of the Office of Production Research and Development.

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Glyco Products Assigns Dr. Peters

Dr. Franklin T. Peters has been assigned to the newly formed Development Department of Glyco Products Company, Brooklyn, N. Y. He has been with the company, in the Sales Department, since 1947 following ten years with E. I. du Pont de Nemours & Co. in research positions. Dr. Peters will be available for consultation on new chemical products to be made in the extensive facilities available at the Natrium, W. Va. plant.

Dr. Franklin T. Peters

Carlton H. Rose

Rose Represents A. S. T. M.

Carlton H. Rose, head of National Lead Company's specification department, has been appointed representative of the American Society for Testing Materials on the Standards Council of the American Standards Association. The Standards Council is the governing body for all technical activities of the American Standards Association.

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A. D. M. Consolidates Activities

Consolidation of all drying oil sales activities at the Minneapolis office was announced by J. W. Moore, Vice-President of Archer-Daniels-Midland Company. This move transfers to the home office sales of certain specialized products made by the Werner G. Smith Co., a division of ADM at Cleveland.

The oils involved are used in the manufacture of paints, enamels, varnishes and lacquers. Specific oils affected include refrigerated fish oils, oxidized fish oils, kettle bodied fish oils, synthesized copolymer oils, polyesters, and china wood (tung) oils. The Cleveland office of the Werner G. Smith Company will continue to handle the sale of core oils and chemical products.

R. S. Mathews of Cleveland is being transferred to Minneapolis to direct the sale of fish oil products to the protective coating industry. For the past four years Mathews has been manager of the ADM Cleveland office. Prior to that he was with the Minneapolis Technical Service Staff.

U. S. Testing and Esselen Merger

The integration of two of the leading scientific laboratories in this country, the United States Testing Company, Inc., Hoboken, New Jersey, and the Esselen Research Corporation, Boston, Massachusetts, was announced by Allen L. Brassell, and Dr. Gustavus J. Esselen presidents of the two organizations. The Esselen Research Corporation is now known as the Esselen Research Division of the United States Testing Company, Inc., and will continue its operations in Boston under the direction of Dr. Esselen, its founder.

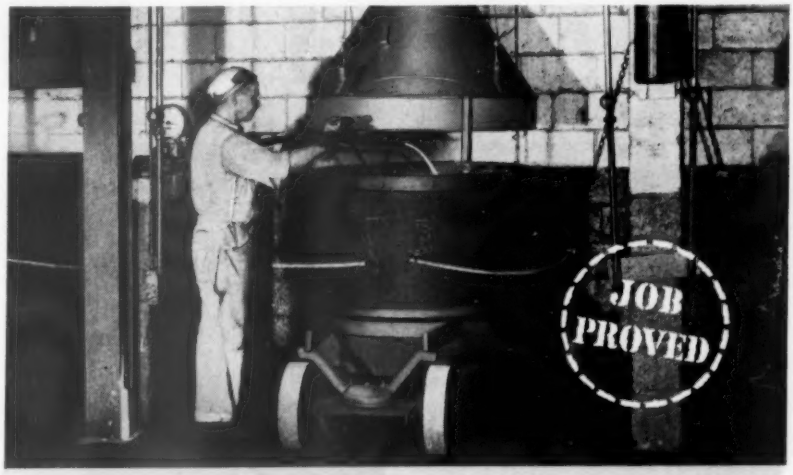
This merger makes available to industry a unique combination of research personnel, facilities and experience, and it multiplies the scope and potentials of both organizations in basic and applied research for industry and government.

E. F. Drew Promotes Zinzalian

E. F. Drew & Co., Inc. has announced the appointment of Dr. George Zinzalian as sales manager of the Technical Products division.

Dr. Zinzalian has been connected with the Drew organization for over 16 years, serving in important capacities including supervision of production, product development and research at the Boonton, New Jersey plant.

Dr. Zinzalian will direct the sales and service activities of the Technical Products division and Textile and Leather Oils departments. He will be responsible for the sale of all products produced by these departments including fatty acids, sulphonated oils, synthetic esters and cationic softeners.



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George M. Hartley

G-E Appoints Alkyd Plant Mgr.

George M. Hartley has been appointed manager of the General Electric Company's Glyptal alkyd resin plant in Schenectady, N. Y., it was announced by Paul F. Preston, manufacturing manager of the Chemicals Division. This plant manufactures resins for use in the paint industry, polyester resins for the coatings industry, plasticizers, varnishes, and other chemicals.

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Allied Finishing Appointments

The Allied Finishing Specialties Company of Chicago, Illinois, manufacturers of industrial protective coatings, announced the appointment of Mr. L. E. Nykamp, 5407 Lake Shore Drive, Holland, Michigan, as their sales representative in the Western half of Michigan. The appointment will include representation for Alabastine Paint Products which was moved from Grand Rapids, Michigan, to Chicago early in 1949 and consolidated with the Chicago Bronze & Color Works, which manufactures all types of paint products sold through dealer outlets.

Mr. L. B. Murphy, 121 East Holbrook Avenue, Flint 5, Michigan has been appointed to represent Alabastine Paint Products, Allied Finishing Specialties Company and the Chicago Bronze & Color Works in the Eastern half of Michigan. For almost two decades Mr. Murphy has served as a sales representative for a paint manufacturer in the Eastern Michigan area, and during three of those years he was employed as a technical paint engineer with special duties on industrial assignments.

Hercules Expands Dallas Office

The industrial growth of the Gulf States region has prompted Hercules Powder Company to expand the Dallas office of its Naval Stores Department.

The Dallas office will now handle the sales of turpentine, pine oil, rosin, and rosin and resin derivatives as well as toxaphene, a chemical base for agricultural insecticides. These products are derived by Hercules from the southern pine. The Dallas office, located in the Gulf States Building, was opened in August, 1948, and up to now handled sales and technical service for toxaphene exclusively.

P. J. Reno, manager of the office, said that the states which would be serviced by the office would include Arkansas, Louisiana, Oklahoma, and Texas.

Baker Elects Fritts V. P.

Haskell H. Fritts has been elected vice president of The Baker Castor Oil Company according to an announcement of I. M. Colbeth, president. Mr. Fritts will assume the responsibilities of director of sales and will be located at the company's head office 120 Broadway, New York City.

He joined The Baker Castor Oil Company as district manager of its Chicago office in 1943 and was promoted, after three years, to manager of Castung sales, operating from the New York office. In 1948 he joined Southern Shellac Manufacturing Co. as vice president, returning to Baker Castor Oil Company in January, 1950 to assume his present position.

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TECHNICAL Bulletins

COATING RESINS

Technical data for coating resins are given in this 30-page loose-leaf notebook covering various physical and chemical properties as color, acid number, viscosity, lb./gal., percent phthalic anhydride and oil, type of oil, and specific gravity of alkyd solutions. Other information covered include percent solids, melting points for phenolic and maleic resins, and penta ester gum and compatibility studies for urea formaldehyde. Uses of each type of resin are also discussed. Plaskon Div., Libbey-Owens-Ford Glass Co., 2144 Sylvan Ave., Toledo 6, Ohio.

ISOPROPENYL ACETATE

This 4-page bulletin describes the physical and chemical properties of isopropenyl acetate covering the chemical reactions with alcohols and amines, acids; halogenation, pyrolysis and polymerization. Tennessee Eastman Corp., Kingsport, Tenn.

SOLUBLE COPOLYMERS

Development Bulletin No. 300-1 describes the physical and chemical characteristics of Lustrex X-810, and offers many suggestions for the handling of the material. Of unusual interest is the section illustrating the use of X-810 as a thickener for various resin emulsion systems. Monsanto Chemical Co., Merrimac Div., Springfield, Mass.

PUMP OPERATION

Instructions for installing and operating centrifugal pumps are covered in detail in this 12-page bulletin. Such pertinent data as shaft alignment priming standards are included. Other topics covered include starting pump for the first time, adjusting and replacing impellers, impeller reinstallation, etc. The Duriron Co., Inc., Dayton 1, Ohio.

NEW PRODUCTS

The New Products Development Department of American Cyanamid Company announces the publication of "Collective Volume I" a compilation of data on several new chemicals which have become available from the company's research laboratories during the last year, and on which separate bulletins have been issued. Some of the chemicals covered are: Aryl Biguanides, Guanylurea Salts, Beta Chloropropionitrile, Dialkyl Cyanamides, Glycolonitrile, Lactonitrile Succinonitrile, Potassum Cyanate. Copies of this bulletin are available upon written request to the New Products Development Department, American Cyanamid Company, 30 Rockefeller Plaza, New York 20, New York.

SOLVENTS BOOKLET

A revised booklet, "Solvents for Modern Industry" has been published recently by the American Mineral Spirits Company. It contains a list of some forty petroleum solvents both aliphatic and aromatic, with the specifications of each. Tabular data on the uses of the various solvents is presented broken down according to application. Also included is a comparative evaporation chart. This chart is based upon the evaporation rate of the various solvents under standard conditions. From the data which is plotted in graph form can be determined the drying times of the new solvents in relation to the commonly used solvents such as toluol. The booklet may be obtained by writing to the American Mineral Spirits Company, 230 North Michigan Avenue, Chicago, Illinois.

DRIER BULLETIN

A new bulletin on Witco driers, especially designed to make it as useful as possible to paint chemists and technologists, is announced by the Witco Chemical Company, 295 Madison Avenue, New York, N. Y. The bulletin gives general rules for determining the proper drier for the newer raw materials, with suggestions for handling and testing drier formulations. Graphs for easy calculation of drier requirements are included.

EPICHLOROHYDRIN

A new revised 55-page booklet on epichlorohydrin has just been published and is now available on letterhead request from Shell Chemical Corporation, 500 Fifth Avenue, New York 18, New York or 100 Bush Street, San Francisco 6, California.

The physical properties, including azeotropic data, of pure and commercial epichlorohydrin are tabulated for easy reference. The booklet describes the chemical behavior of epchloirohydrin with many organic substances, including aldehydes, ketones, alcohols, Grignard and other organometallic compounds, phenols and carboxylic acids.

Of particular interest to the chemist is the bibliography which contains over 250 references. In addition, there is a brief discussion on storage and handling.

SORBITOL LACQUERS

Bulletin P-2 recently released by the Industrial Chemicals Dept., Wilmington 99, Del. contains procedures for the preparation and evaluation of three resins formed from sorbitol to be used in wood lacquer formulations. According to the bulletin, the chemical modification of maleic hard gums with non-drying plasticizing oils results in resins which impart good cold check resistance to lacquers. However, coatings based on conventional hard gums modified in this manner are usually different in sanding properties and this may be eliminated by the use of sorbitol.

TAG PRODUCTS

A new 16-page catalog, "TAG Laboratory Thermometers and Hydrometers," has been published by the C. J. Tagliabue Corporation (N. J.). It illustrates and describes the complete line of TAG Thermometers and Hydrometers for use in chemical and industrial laboratories. Listings include TAG Standard Grade, A. S. T. M., and Extreme Precision Etched Stem Thermometers, and TAG Certified and A. P. I. Hydrometers. Also contained in the catalog are useful Fahrenheit-Centigrade conversion tables. This literature is available without charge; write for Catalog 1100E, to C. J. Tagliabue Corporation (N. J.), 614 Frelinghuysen Avenue, Newark 5, New Jersey.

PAPER LACQUERS

A basic data booklet on nitrocellulose packaging and paper lacquers, the result of extensive research, has been issued by Hercules Powder Company, Wilmington, Del.

The new 32-page booklet includes a description of the formulations and materials used in the research and detailed results of the investigations. There are 16 charts and graphs that illustrate and supplement the text. Paper-coating properties investigated and reported on include flexibility, grease resistance, scuff resistance, color, stability, and specular gloss. In each instance, the effect of the resin and plasticizer on these properties is described.

Sections on heat-sealing coatings and moistureproof heat-sealing coatings are also included in the booklet as well as suggested starting formulations for paper-coating lacquers. An explanation of testing methods and description of lacquer components, solvent, paper-coating method, and coating cycle used in the research are cited.

ELECTROGRAPHIC PRINTING

This is a reprint of the article entitled "Pore Size in Protective Film by Electrographic Printing" by W. E. Shaw and E. T. Moore of the National Lead Co., Research Laboratories, Brooklyn, N. Y. which appeared in Analytical Chemistry, October 1947. It deals with the technique for the electrographic printing of pores in protective films by the use of a sandwich consisting of metal pressure platens, a sheet of paper in contact with the area of coated metal to be studied, and a proper electrolyte.

LEAK DETECTOR

A new 4 page Bulletin, titled Veeco Mass Spectrometer Leak Detector, has just been issued by Vacuum-Electronic Engineering Co., 316 37th St., Brooklyn 32, N. Y.

Contents describes typical applications, wherever a vacuum, fixed pressure or special atmosphere must be maintained for extended periods of time; prinicple of operation, features, and pertinent data pertaining to Vacuum testing and pressure testing with explanatory illustrations. Write for Bulletin LD-75.

VENTILATION

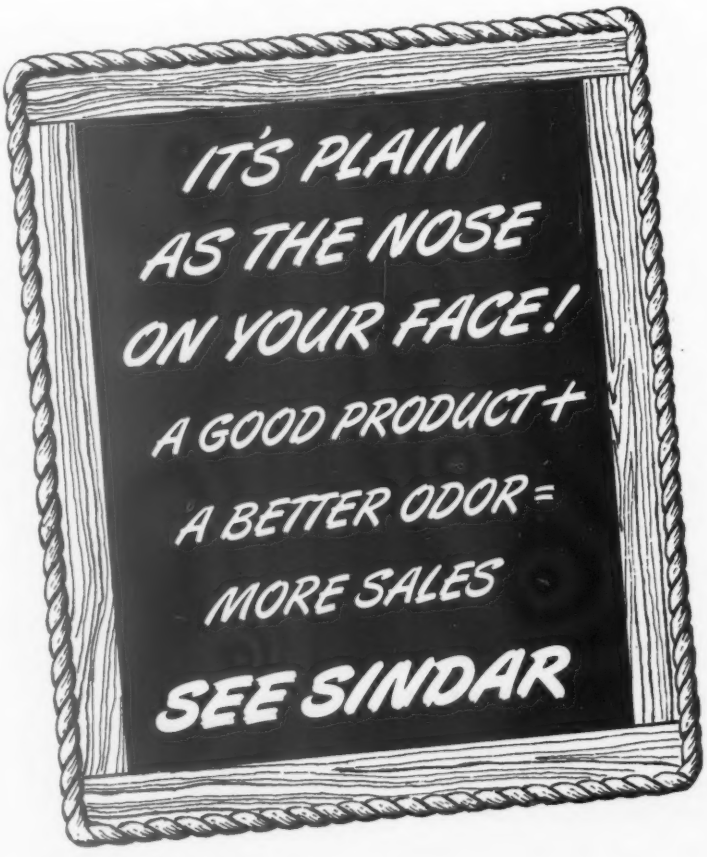
Mechanical ventilation of industrial structures to remove air contaminated by fumes, dust or gases necessitates another function that is of equal importance—replacing, or making up, the air that has been exhausted from the building.

How this can be accomplished efficiently and economically in industry is described in a new illustrated brochure published by the Heating Section of Dravo Corporation, Pittsburgh. Copies may be obtained without charge by writing for Bulletin 520. Introduction of clean, fresh "tempered" makeup air into a factory structure, the bulletin explains, has two primary benefits:

1. Improvement of employee health and morale by elimination of foul air.
2. Balancing atmospheric pressure inside the building to increase the efficiency of combustion equipment and ventilating systems.

CAR LOADING AND UNLOADING

Manual Sheet TC-7, "Tank Car Loading and Unloading Platforms" contains information on the proper types of platforms for safe loading and unloading of tank cars. Types now in use are described. Write to Manufacturing Chemists' Association, 246 Woodward Bldg., Washington, D. C. for your copy. Price 20 cents.



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CLUB NEWS

BALTIMORE

Oakley H. Garlick of the Paul O. Abbe Co. was guest speaker at the January meeting held on the 13th. He spoke on "Closed Mill Grinding" and his talk was supplemented with a colored movie on an experimental closed mill. In this manner it was shown what happens inside a closed mill.

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C–D–I–C

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Mr. Trussell pointed out that new developments in the resin field were not necessarily from basic research on raw materials but more often from the upgrading of existent types of resins and processes worked out to produce them economically. The war years, due to shortages, substitutions and specific requirements for government needs, had a big influence on the development of resins. Some of the new developments since the war have been Pentaerythritol long oil resins, improved vinyl resins, long chain plasticizers and styrenated alkyds. Properties of alkyds ureas and melamines have all been improved.

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Item S-911-R (Equipped with molded-on rubber wheels—10" in diameter) $38.50
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PAPER LACQUERS

A basic data booklet on nitrocellulose packaging and paper lacquers, the result of extensive research, has been issued by Hercules Powder Company, Wilmington, Del.

The new 32-page booklet includes a description of the formulations and materials used in the research and detailed results of the investigations. There are 16 charts and graphs that illustrate and supplement the text. Paper-coating properties investigated and reported on include flexibility, grease resistance, scuff resistance, color, stability, and specular gloss. In each instance, the effect of the resin and plasticizer on these properties is described.

Sections on heat-sealing coatings and moistureproof heat-sealing coatings are also included in the booklet as well as suggested starting formulations for paper-coating lacquers. An explanation of testing methods and description of lacquer components, solvent, paper-coating method, and coating cycle used in the research are cited.

ELECTROGRAPHIC PRINTING

This is a reprint of the article entitled "Pore Size in Protective Film by Electrographic Printing" by W. E. Shaw and E. T. Moore of the National Lead Co., Research Laboratories, Brooklyn, N. Y. which appeared in Analytical Chemistry, October 1947. It deals with the technique for the electrographic printing of pores in protective films by the use of a sandwich consisting of metal pressure platens, a sheet of paper in contact with the area of coated metal to be studied, and a proper electrolyte.

LEAK DETECTOR

A new 4 page Bulletin, titled Veeco Mass Spectrometer Leak Detector, has just been issued by Vacuum-Electronic Engineering Co., 316 37th St., Brooklyn 32, N. Y.

Contents describes typical applications, wherever a vacuum, fixed pressure or special atmosphere must be maintained for extended periods of time; prinicple of operation, features, and pertinent data pertaining to Vacuum testing and pressure testing with explanatory illustrations. Write for Bulletin LD-75.

VENTILATION

Mechanical ventilation of industrial structures to remove air contaminated by fumes, dust or gases necessitates another function that is of equal importance—replacing, or making up, the air that has been exhausted from the building.

How this can be accomplished efficiently and economically in industry is described in a new illustrated brochure published by the Heating Section of Dravo Corporation, Pittsburgh. Copies may be obtained without charge by writing for Bulletin 520. Introduction of clean, fresh "tempered" makeup air into a factory structure, the bulletin explains, has two primary benefits:

1. Improvement of employee health and morale by elimination of foul air.
2. Balancing atmospheric pressure inside the building to increase the efficiency of combustion equipment and ventilating systems.

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temperature. A few of the comments made by Mr. Trussell were: Styrenated alkyds are replacing brushing lacquer, they have the durability of good alkyds. In traffic paint, a medium oil length alkyd is best by far because of abrasion resistance. Styrenated resins are finding quite a bit of use in washing machine and farm equipment enamels.

The development of copolymer resins is being worked on. Mr. Trussell asked how far does the paint manufacturer want to go? What is wanted and what is not? After the question and answer period, the meeting was adjourned with a rising vote of thanks to our speaker.

PHILADELPHIA

One hundred and one members and guests attended the January meeting held on the 18th at the Engineers Club.

Mr. George Cook of the Protective Coatings Section of the Engineer Research & Development Laboratories of the Corps of Engineers was the guest speaker. He discussed the various protective coating problems of the Corps of Engineers such as maintaining of barracks and permanent installations, evaluation of various metal protective primers now in the specifications as well as proposed paints, development of specifications for fire retardant paints, pipeline coatings, and protective paints for locks and dams. His talk was illustrated with both slides and motion pictures.

CLASSIFIED ADVERTISEMENTS

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NEW YORK

Over 250 members and guests attended the February meeting held on February 2nd, at the dining room of the Building Trades Employers' Association of #2 Park Ave., New York City.

The guest speaker was Oakley H. Garlick of Paul O. Abbe, Inc. Mr. Garlick presented an interesting colored film study of what happens under various grinding conditions. The possibilities of improved grinding procedures were revealed and a very interesting discussion on the basic principles of obtaining optimum dispersions in the shortest time were illustrated.

CALENDAR OF EVENTS

Feb. 27–Mar. 2. A. S. T. M. Spring Meeting, Hotel William Penn, Pittsburgh, Pa.

Mar. 8–10. Southern Paint and Varnish Production Clubs, Peabody Hotel, Memphis, Tenn.

Mar. 14. Synthetic Organic Chemical Manufacturers Association Meeting, Commodore Hotel, New York, N. Y.

Mar. 28–31. National Plastics Exposition, Navy Pier, Chicago, Ill.

April 4–7. National Association of Corrosion Engineers Conference, Hotel Jefferson, St. Louis, Mo.

April 24–27. National Packaging Exposition of the American Management Association, Navy Pier, Chicago, Ill.

April 25. Association of Consulting Chemist and Chemical Engineers Meeting, Shelburne Hotel, New York, N. Y.

April 25–26. Metal Powder Show and Annual Meeting, Book-Cadillac, Detroit Mich.

May 1–3. American Oil Chemists Society, Atlanta Biltmore Hotel, Atlanta, Ga.

May 15–17. National Cottonseed Products Association Meeting, Shamrock Hotel, Houston, Texas.

June 26–30. 1950 A. S. T. M. Annual Meeting and Exposition of Testing Apparatus and Equipment, Chalfonte-Haddon Hall, Atlantic City, N. J.

Nov. 9–11. Federation of Paint and Varnish Production Clubs Convention, Congress Hotel, Chicago, Ill.

Nov. 15–18. National Paint, Varnish and Lacquer Association Convention, Fairmont Hotel, San Francisco, Calif.

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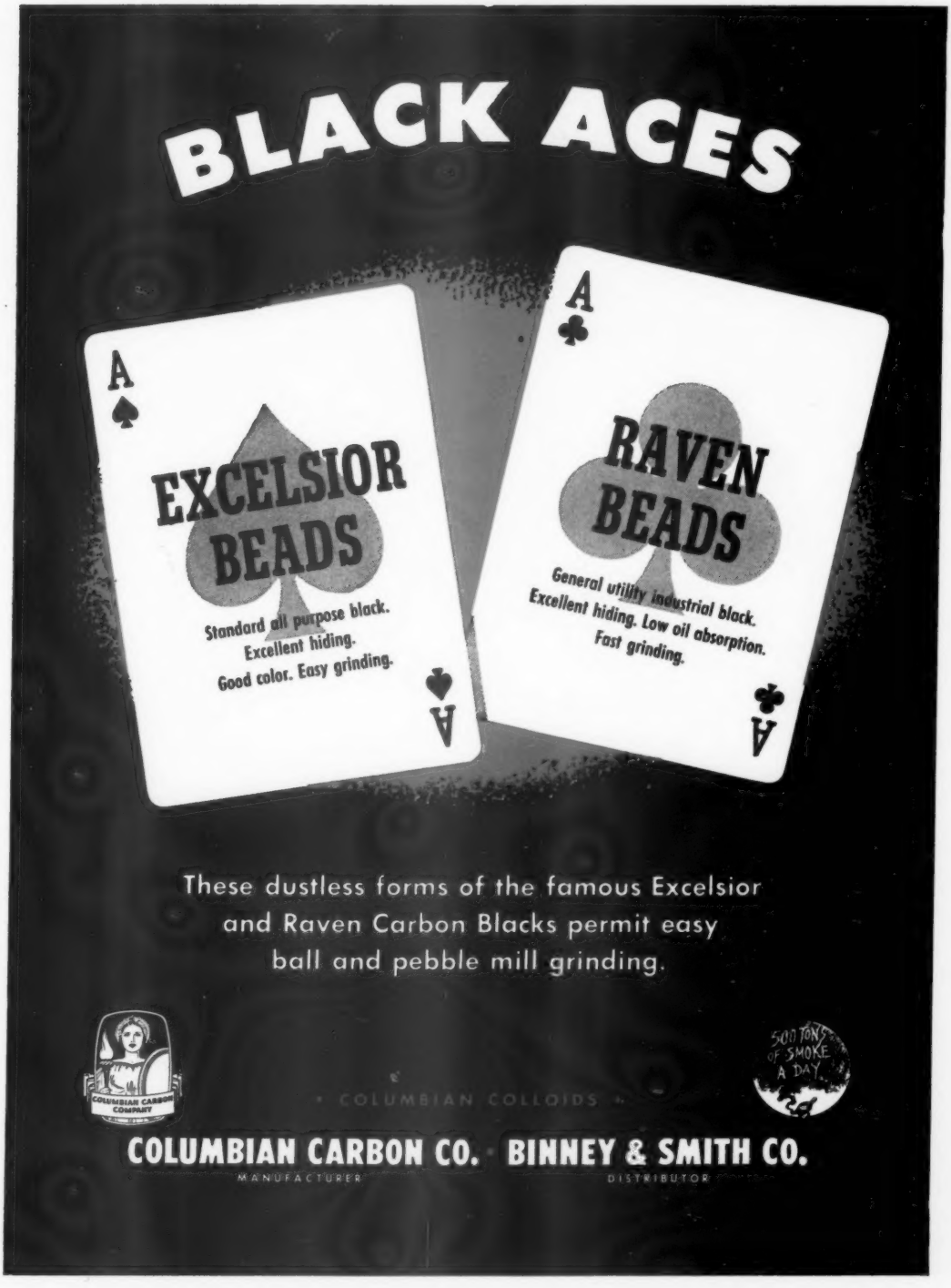

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